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A
DICTIONARY
OF
EVERY-DAY WANTS
CONTAINING
TWENTY THOUSAND RECEIPTS
IN NEARLY EVERY DEPARTMENT OF HUMAN EFFORT

BY
A. E. YOUMAN, M. D.

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PREFACE.

In these days of steam and electricity, when every man is jostling and crowding his neighbor in the race for wealth and independence, every hour, every minute has its money value. To economise time by its admirably arranged contents; to save money by its multitudinous hints and aids; to relieve perplexities that are ever occurring in our daily plans of life by its numberless suggestions; to promptly offer remedies when sudden death is threatened, as in accidental poisoning, will be found to be embodied in the following pages, and so be an aid to the progressive hurrying spirit of the age.

In its editing and compiling, the principal aim has been to render it as extensively useful as possible, and no exertion has been spared to make the work a correct, comprehensive and conveniently arranged manual of reference to the Housekeeper, Manufacturer, Tradesman and Agriculturist. It will be found to contain directions for the preparation of several thousand articles of interest and utility, many of which have never appeared in print before.

Care has been taken to avoid all difficult, technical and scientific terms, and to make it so simple in language and arrangement, as to insure its value as a useful and reliable work for every-day reference.

A. E. Y.

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When an article cannot be found by its proper alphabetic arrangement, under any of the above sections, a reference to the very copious index at the end of the work, will lead to its discovery.

A DICTIONARY OF EVERY-DAY WANTS.

ACCIDENTS AND EMERGENCIES.

ACCIDENTS, To Avoid and Prevent.—In walking the streets keep out of the line of cellars, and never look one way and walk another. 2. Never ride with your arm or elbow outside any vehicle. 3. Never alight from a steam-car while in motion. 4. In stepping from any wheeled vehicle while in motion, let it be from the rear, and not in front of the wheels; for then, if you fall, the wheels cannot run over you. 5. Never attempt to cross a road or street in a hurry, in front of a passing vehicle; for if you stumble or slip you will be run over. Make up the half minute lost in waiting until the vehicle has passed by increased diligence in some other direction. 6. In a run-away, it is safer, as a rule, to keep your place and hold fast than to jump out. Getting out of a carriage over the back, provided you can hold on a little while, is safer than springing from the side. 7. Be particularly cautious when upon or in the vicinity of water. 8. During a time of lightning avoid the neighborhood of trees, or any leaden spout, iron gate, or other conductor of electricity. 9. Lay loaded guns in safe places, and never imitate firing a gun in jest. 10. Never sleep near lighted charcoal; if drowsy at any work where charcoal fires are used, take the fresh air. 11. Never blow out the gaslight, but turn it off, and before retiring see that none of it escapes. 12. When benumbed with cold beware of sleeping out of doors; exercise yourself vigorously; rub yourself, if able, with snow, and do not hastily approach the fire. 13. If caught in a drenching rain, or if you fall in the water, keep in motion sufficiently vigorous to prevent the slightest chilly sensation until you reach the house; then change your clothing with great rapidity before a blazing fire, and drink instantly a pint of some hot liquid, not spirituous. 14. Before entering vaults or dry wells see if a lighted candle will burn at the bottom; for if not, animal life cannot exist, and the foul air in it should be replaced by pure air before entering therein. 15. Never leave saddle or draught horses, while in use, by themselves; nor go immediately behind a led horse, as he is apt to kick. 16. Ride not on footways, and walk not on carriage roads or railroad tracks. 17. Be wary of children, whether they are up or in bed, and particularly when they are near the fire, an element with which they are very apt to amuse themselves. 18. Leave nothing poisonous open or accessible, and never omit to write the word "POISON" in large letters upon it, wherever it may be placed. 19. Never throw pieces of orange peel on the sidewalk, or throw broken glass bottles into the streets. 20. Never meddle with gunpowder by candlelight. 21. Never trim or fill a kerosene

lamp while lighted, and never light a fire with kerosene or coal oil. 22. Keep lucifer matches in their cases, and never let them be strewed about. 23. During frosty weather take extra care in walking. 24. Have your horses' shoes roughed directly there are indications of frost. 25. Before retiring for the night, carefully look through the house to see that everything is as it ought to be.

BITES, Harvest Bug.—The most effectual remedy is benzine, which immediately kills the insect.—A minute drop of tincture of iodine has the same effect.—Many sufferers prevent the attacks by sprinkling a little benzine over the stockings before walking.

BITES, Insect.—Such as bees, wasps, hornets, scorpions, etc., may be instantly relieved by the immediate and free application of spirits of hartshorn as a wash to the part bitten. The part may afterward be covered with a little sweet oil. See *Stings*.

BITES, Mad Dog.—1. Take immediately warm vinegar or tepid water; wash the wound clean therewith and then dry it; pour upon the wound, then, ten or twelve drops of muriatic acid. Mineral acids destroy the poison of the saliva, by which means the evil effects of the latter are neutralized.—2. Many think that the only sure preventive of evil following the bite of a rabid dog, is to suck the wound immediately, before the poison has had time to circulate with the blood. If the person bit cannot get to the wound to suck it, he must persuade or pay another to do it for him. There is no fear of any harm following this, for the poison entering by the stomach cannot hurt a person. A spoonful of the poison might be swallowed with impunity, but the person who sucks the place should have no wound on the lip or tongue, or it might be dangerous. The precaution alluded to is a most important one, and should never be omitted prior to an excision and the application of lunar caustic in every part, especially the interior and deep-seated portions. No injury need be anticipated if this treatment is adopted promptly and effectively. The poison of hydrophobia remains latent on an average six weeks; the part heals over, but there is a pimple or wound, more or less irritable; it then becomes painful, and the germ, whatever it is, ripe for dissemination into the system, and then all hope is gone. Nevertheless, between the time of the bite and the activity of the wound previous to dissemination, the caustic of nitrate of silver is a sure preventive; after that it is as useless as all the other means. The best mode of application of the nitrate of silver, is by introducing it solidly into the wound.

BITES, Snake.—The poison inserted by the stings and bites of many venomous reptiles is so rapidly absorbed, and of so fatal a description, as frequently to occasion death before any remedy or antidote can be applied; and they are rendered yet more dangerous from the fact that these wounds are inflicted in parts of the country and world where precautionary measures are seldom thought of, and generally at times when people are least prepared to meet them. 1. In absence of any remedies, the first best plan to adopt on being bitten by any of the poisonous snakes is to do as recommended above in Mad Dog Bites—viz., to wash off the place immediately; if possible, get the mouth to the spot, and forcibly suck out all the poison, first applying a ligature above the wound as tightly as can be borne.—2. A remedy promulgated by the Smithsonian Institution is to take 30 grs. iodide potassium, 30 grs. iodine, 1 oz. water, to be applied externally to the wound by saturating lint or batting—the same to be kept moist with the antidote until the cure be effected, which will be in one hour, and sometimes instantly.—3. An Australian physician has tried and recommends carbolic acid, diluted and administered internally every few minutes until recovery is certain.—4. Another Australian physician, Professor Halford, of Melbourne University, has discovered that if a proper amount of dilute ammonia be injected into the circulation of a patient suffering from snake-bite, the curative effect is usually sudden and startling, so that in many cases men have thus been brought back, as it were, by magic, from the very shadow of death. The method finally adopted by Professor Halford, after many experiments, and approved by his associates, is this: As soon as possible after a bite, which, without treatment, threatens life, thirty drops of the liquor ammoniac (not liquid ammonia) in water—one part of the ammonia and two parts water—are injected, by a hypodermic syringe, directly into some superficial vein of the patient. Of course, none but a skilled or practiced hand should undertake the operation, since the accident of injecting a small bubble of air with the solution might be fatal. There is no stage of exhaustion, so long as life remains, in which there is not hope of success by this remedy. A small syringe with a sharp point, for the purpose of making the injection, is manufactured and sold in Melbourne, and now few travel in that country without one.

BITES, Of the Cobra.—The bite of the cobra, says an experienced surgeon of India, or of any other poisonous snake or reptile, can be cured by administering a few drops of a preparation of the gall of the cobra, which should be prepared as follows: Pure spirits of wine, or 95 per cent. alcohol, or the best high wines that can be procured, 200 drops; of the pure gall, 20 drops; in a clean two-ounce phial, corked with a new cork; give the phial 150 or 200 shakes, so that the gall may be thoroughly mixed with the spirits, and the preparation is ready for use. In case of a bite put five drops (no more) of the preparation into half a tumblerful of pure water; pour the water from one tumbler into another, backwards and forwards, several times, that the preparation may be thoroughly mixed with the water, and administer a large tablespoonful of the mixture every three or five minutes until the whole has been given. In case the violence of

the pain and hemorrhage or swelling of the bitten part should be but slightly alleviated after the whole has been taken, repeat the dose, prepared with the same quantity of the preparation, in the same way, and administer as before. In curing upwards of fifty cases of snake bites I have never been obliged to repeat the dose except in two instances, and have never lost a case. The cobra poison is no more deadly than that of a great variety of snakes found in South America, of which may be named the *Cascabel*, or *Rattlesnake*; *Boqui-dorada*, or gilded mouth; *Mapana-sapo*, or frog-headed Mapana; *Mapana-fina*, or *Lachesis*; *Niger*, *Birri*, and *Verrugosa*, or wart snake. The poison of all these varieties produces death (under certain conditions—atmospherical, physical, climatical, and electrical) in from fifteen minutes to two or three hours; but it is found that the gall of each variety (administered as previously indicated) is the perfect antidote for its own poison. The gall of the most deadly kind may be used in cases of bites of those less virulent, and is also applicable in cases of bites of the centipede, scorpion, stingray, star-lizard, or *Lacerta stella*, and is also very effective in dog-bites.

BLEEDING OF WOUNDS.—See *Cuts*.

BLEEDING AT THE NOSE.—1. Roll up a piece of paper, and press it up under the upper lip.—2. In obstinate cases blow a little gum Arabic up the nostrils through a quill, which will immediately stop the discharge; powdered alum is also good.—3. Pressure by the finger over the small artery near the *ala* (wing) of the nose, on the side where the blood is flowing, is said to arrest the hemorrhage immediately.

BLEEDING FROM THE LUNGS.—A New York physician has related a case in which inhalation of very dry persulphate of iron, reduced to a palpable powder, entirely arrested bleeding from the lungs, after all the usual remedies, lead, opium, etc., had failed. A small quantity was administered by drawing into the lungs every hour during part of the night and following day.

BURNS AND SCALDS.—1. By putting the burned part under cold water, milk, or other bland fluid, instantaneous and perfect relief from all pain will be experienced. On withdrawal, the burn should be perfectly covered with half an inch or more of common wheat flour, put on with a dredging box, or in any other way, and allowed to remain until a cure is effected, when the dry, caked flour will fall off, or can be softened with water, disclosing a beautiful, new and healthy skin, in all cases where the burns have been superficial.—2. Dissolve white lead in flaxseed oil to the consistency of milk, and apply over the entire burn or scald every five minutes. It can be applied with a soft feather. This is said to give relief sooner, and to be more permanent in its effects, than any other application.—3. Make a saturated solution of alum (four ounces to a quart of hot water). Dip a cotton cloth in this solution and apply immediately on the burn. As soon as it becomes hot or dry, replace it by another, and continue doing so as often as the cloth dries, which at first will be every few minutes. The pain will immediately cease, and after twenty-four hours of this treatment the burn will be healed, especially if commenced before blisters are formed. The as-

tringent and drying qualities of the alum will entirely prevent their formation.—4. Glycerine, five ounces; white of egg, four ounces; tincture of arnica, three ounces. Mix the glycerine and white of egg thoroughly in a mortar, and gradually add the arnica. Apply freely on linen rags night and morning, washing previously with warm castile soapsuds.—5. Take 1 drachm of finely powdered alum, and mix thoroughly with the white of 2 eggs and 1 teacup of fresh lard; spread on a cloth, and apply to the parts burnt. It gives almost instant relief from pain, and, by excluding the air, prevents excessive inflammatory action. The application should be changed at least once a day.—6. M. Joel, of the Children's Hospital, Lausanne, finds that a tepid bath, containing a couple of pinches of sulphate of iron, gives immediate relief to young children who have been extensively burned. In a case of a child four years old, a bath repeated twice a day—20 minutes each bath—the suppuration decreased, lost its odor, and the little sufferer was soon convalescent.—7. For severe scalding, carbolic acid has recently been used with marked benefit. It is to be mixed with 30 parts of the ordinary oil and lime water to 1 part of the acid. Linen rags saturated in the carbolic emulsion are to be spread on the scalded parts, and kept moist by frequently smearing with a feather dipped in the liquid. Two advantages of this mode of treatment are, the exclusion of air, and the rapid healing by a natural restorative action without the formation of pus, thus preserving unmarred the personal appearance of the patient—a matter of no small importance to some people.

CRAMP.—Spasmodic or involuntary contractions of the muscles, generally of the extremities, accompanied with great pain. The muscles of the legs and feet are those most commonly affected with cramp, especially after great exertion. The best treatment is immediately to stand upright, and to well rub the part with the hand. The application of strong stimulants, as spirits of ammonia, or of anodynes, as opiate liniments, has been recommended. When cramp occurs in the stomach, a teaspoonful of sal volatile in water, or a dram glassful of good brandy, should be swallowed immediately. When cramp comes on during cold bathing, the limb should be thrown out as suddenly and violently as possible, which will generally remove it, care being also taken not to become flurried nor frightened; as presence of mind is very essential to personal safety on such an occasion. A common cause of cramp is indigestion, and the use of acedent liquors; these should be avoided.

CUTS.—First stop the bleeding, by bringing the edges of the wound together, if the flow is but trifling. If, on the contrary, it is large, of a bright vermilion color, and flows in spurts or with a jerk, an artery is severed, and at once should pressure be made on the parts by the finger, (between the cut and the heart,) until a compress is arranged by a tight ligature above the wounded part. Then the finger may be taken off, and if the blood still flows, tighten the handkerchief, or other article that forms the ligature, until it ceases. If at this point the attendance of a physician or surgeon cannot be secured, take strong silk thread, or wax together three or four threads, and cut them into lengths of about a foot long. Wash the parts with

warm water, and then with a sharp hook or small pair of pincers in your hand, fix your eye steadfastly upon the wound, and directing the ligature to be slightly released, you will see the mouth of the artery from which the blood springs. At once seize it, draw it out a little, while an assistant passes a ligature round it, and ties it up tight with a double knot. In this way take up in succession every bleeding vessel you can see or get hold of. If the wound is too high up in a limb to apply the ligature, do not lose your presence of mind. If it is the thigh, press firmly on the groin; if in the arm, with the hand-end or ring of a common door-key make pressure above the collar-bone, and about its middle, against its first rib, which lies under it. The pressure should be continued until assistance is procured and the vessel tied up. If the wound is on the face, or other place where pressure cannot effectually be made, place a piece of ice directly over the wound, allowing it to remain there until the blood coagulates, when it may be removed, and a compress and bandage be applied.

After the bleeding is arrested the surrounding blood should be cleared away, as well as any extraneous matter; then bring the sides of the wound into contact throughout the whole depth, in order that they may grow together as quickly as possible, retaining them in their position by strips of adhesive plaster. If the wound be deep and extensive, the wound itself and the adjacent parts must be supported by proper bandages. The position of the patient should be such as will relax the skin and muscles of the wounded part. Rest, low and unstimulating diet, will complete the requirements necessary to a speedy recovery.

DROWNING, To Restore the Apparently.—Lose no time. Handle the body gently, carrying it with the head slightly raised, and never holding it up by the feet. While medical assistance is being sent for, remove the clothing from the body, rub it dry; then roll it in hot blankets and place it in a warm bed in a warm room. Cleanse away the froth and mucus from the nose and mouth. Apply warm bricks, bottles, bags of sand, etc., to the arm-pits, between the thighs and at the soles of the feet. Rub the surface of the body with the hands inclosed in warm, dry worsted socks. **To Restore Breathing.**—While the patient is lying with the face downwards, place one of the arms under the forehead, as in this position fluids will more readily escape by the mouth, and the tongue itself will fall forward, leaving the entrance to the windpipe free. Assist this operation by wiping and cleansing the mouth. If there be only slight breathing, or no breathing, turn the patient on the side, and excite the nostrils with snuff, hartshorn, or smelling salts, or tickle the throat with a feather, etc. Rub the chest and face well, and dash warm and cold water alternately on them. If there is still no success, try to imitate breathing by replacing the patient with face downwards, raising and supporting the chest on a folded coat or other article. Then turn the body very gently on one side and a little beyond, and briskly back again, repeating these measures cautiously and perseveringly about 15 times a minute. By placing the patient on his chest, the weight of the body forces the air out. When turned on one side the pressure is removed, and

air enters the chest. When the body is replaced on the face, use uniform pressure between the shoulder-blades or bones on each side, and let one person attend solely to the movement of the head and of the arm placed under it. Dry the hands and feet, and as soon as dry clothing or blankets can be procured, strip the body and reclothe it, taking care not to interfere with the efforts to restore breathing.

Should these efforts not prove successful in five minutes, grasp the arms above the elbow, and draw them gently upwards above the head, keeping them stretched upwards for two seconds. By this means air is drawn into the lungs. Then turn down the arms, and press them gently for two seconds against the sides of the chest. By this means air is pressed out of the lungs. Repeat these motions perseveringly, about fifteen times in a minute, until a spontaneous effort to respire is perceived.

After the natural breathing is restored, promote warmth and circulation by rubbing the limbs upwards by means of flannels, etc. By this process the blood is propelled towards the heart. Apply hot flannels, or bottles of hot water, to the pit of the stomach, the arm-pits, thighs, and soles of the feet. If the power of swallowing be restored, small quantities of wine, warm brandy and water, or coffee, should be administered. Keep the patient in bed, and let sleep be encouraged. This treatment should be persevered in for hours, as it is a mistake to fancy that persons are irrecoverable because life does not soon make its appearance. Do not allow any crowding round the body, and under no circumstances hold it up by the feet, or put it in a warm bath, unless under medical directions.

Cautions.—Never rub the body with salt or spirits. Never roll the body on casks. Continue the remedies for 12 hours without ceasing. The appearances which generally accompany death by drowning are suspension of the motion of the heart, the eyelids half closed and the pupils dilated, the jaws clenched, the fingers half contracted, the tongue approaches to the under edge of the lips, and these, as well as the nostrils, are covered with a frothy mucus, and coldness and pallor increase.

DROWNING, To Afford Assistance to a Person in Danger of.—If the spectator is unable to swim, and can make the sufferer hear, he ought to direct him to keep his hands and arms under water until assistance comes; in the meantime throw towards him a rope, a pole, or anything that may help to bring him ashore or on board; he will eagerly seize whatever is put within his reach; thus he may, perhaps, be rescued from his perilous situation.

The best manner in which an expert swimmer can lay hold of a person he wishes to save from sinking, is to grasp his arm firmly between the shoulder and the elbow; this will prevent him from clasping the swimmer in his arms, and thus forcing him under water, and, perhaps, causing him to sink with him.

DRUNKENNESS, Apparent Death from.—Raise the head, unloose the clothes, maintain warmth of surface, and give a mustard emetic as soon as the person can swallow.

EYE, Cinders or Dirt in the.—The cinder or other foreign substance will usually be found just underneath the margin of the upper lid, where there is a groove or gutter for the flow of tears

to the inner angle of the eye. Foreign bodies tend to fall into this groove, and if they are angular, like a cinder, they adhere in spite of the current of tears which now flow in greater abundance, and sooner or later carry off smooth substances. To remove it, take, say a lead pencil, in the fingers of the right hand, and with the thumb and forefinger of the left hand seize the eyelashes of the upper lid, and drawing the lid gently out from the ball, press the point of the pencil downward upon the upper surface of the lid, about one-fourth of an inch from its margin, and at the same time carry the margin upward over the pencil by the eyelashes, when the lid will readily roll over the pencil so as to expose completely the gutter described, when the cinder or grain of sand may easily be removed with the point of a pencil, or with the finger covered by a handkerchief. The person operated upon should look downward when the lid is being reverted, and upward when the operator wishes to restore the lid. As soon as the substance is removed, bathe the eye with cold water, and exclude the light for a day.

FAINTING.—If a man faint away, instead of yelling out like a savage, or running to him to lift him up, lay him at full length on his back on the floor, loose the clothing, push the crowd away, so as to allow the air to reach him, and let him alone. Dashing water over a person in a simple fainting fit is a barbarity. The philosophy of a fainting fit is that the heart fails to send the proper supply of blood to the brain. If the person is erect, that blood has to be thrown up hill; but if lying down, it has to be projected horizontally, which requires less power, as is apparent.

FROST-BITE.—Take the person frost-bitten into a cold room in which there is no fire, and rub the parts frozen with snow or cold water. After a while friction with flannels and the hand is to be used, and warmth very gradually applied. If a limb is frozen, the cold applications should be continued longer, and warmth be more gradually applied than when the whole body is frozen. Care should be taken to handle the parts carefully, so as not to break off any part, as can so easily be done in its frozen state. *Frozen Feet* are said to be permanently relieved by two or three applications of a boiled lye of wood ashes, made so strong as to be quite slippery between the fingers. This lye should settle, be drained off, and have a large handful of salt to each quart of lye mixed with it. It should be quite warm, and the limbs be submerged for one or two hours.

FIRE IN A CHIMNEY, To Extinguish.—One of the simplest methods is to scatter a handful of flowers of sulphur over the duller part of the burning coals, the mephitic vapors arising from which will not support combustion, and consequently extinguish the flames. Another method is to shut the doors and windows, and to stop up the bottom of the chimney with a piece of wet carpet or blanket, throwing a little water or flowers of sulphur, or salt, on the fire immediately before doing so. By this means the draught is stopped, and the burning soot must be extinguished for want of air. If the chimney be stopped at the top, instead of the bottom, the whole of the smoke must, of course, be driven into the apartment. If every fireplace were provided with a damper, or shutter of sheet-iron or

tin plate, sufficiently large to choke it thoroughly, fires in chimneys would become of little consequence, as it would only be necessary to apply this damper to put them out.

FIRE, To Bring Horses Out of a Stable on.—Throw the saddle or harness, etc., over them, and they will come out immediately.

FIRE, Escaping from.—1. Be careful to acquaint yourself with the best means of exit from the house, both at the top and bottom.—2. On the first alarm, reflect before you act. If in bed at the time, wrap yourself in a blanket or bedside carpet. Open no more doors than are absolutely necessary, and shut every door after you.—3. There is always from eight to twelve inches of pure air close to the ground; if you cannot, therefore, walk upright through the smoke, drop on your hands and knees, and thus progress. A wetted silk handkerchief, a piece of flannel, or a worsted stocking, drawn over the face, permits breathing, and to a great extent excludes the smoke.—4. If you can neither make your way upward or downward, get into a front room; if there is a family, see that they are all collected here, and keep the door closed as much as possible, for remember that smoke always follows a draught, and fire always rushes after smoke.—5. On no account throw yourself, or allow others to throw themselves, from the window. If no assistance is at hand, and you are in extremity, tie the sheets together, having fastened one side to some heavy piece of furniture, and let down the women and children one by one, by tying the end of the line of sheets around the waist, and lowering them through the window that is over the door, rather than the one that is over the area. You can easily let yourself down after the helpless are saved.

FIRE, Clothing on.—If a woman's clothes catch fire, let her instantly roll herself over and over on the ground. If a man be present, let him throw her down and do the like, and then wrap her up in a tablecloth, rug, coat, or the first woollen thing that is at hand.

FIRE, Suggestions to Prevent.—1. Be careful to keep lucifer matches in metal boxes, out of the reach of children.—2. Wax matches are particularly dangerous, and should be kept out of the way of rats and mice; be careful in making fires with shavings and other light kindling.—3. Do not deposit coal or wood ashes in a wooden vessel, and be sure burning cinders are extinguished before they are deposited.—4. Never put firewood upon the stove to dry.—5. Do not put ashes or a light under a staircase.—6. Fill kerosene lamps only in the daytime, and never near a fire or light.—7. Be cautious in extinguishing matches, and never throw them on the floor.—8. Do not throw a cigar stump upon the floor, or into a box containing sawdust, without being certain that it is not on fire.—9. Do not blow out a candle, or put it away on a shelf or anywhere else, until sure that the snuff has gone entirely out.—10. A lighted candle ought not to be stuck up against a frame wall, or placed near any portion of the wood-work in a stable, manufactory, shop, or any other place.—11. Never enter a barn or stable at night with an uncovered light.—12. Ostlers should not be allowed to smoke about stables.—13. Never take an open light to examine a gas meter, or to search for an escape of gas.—14. Do not put gas or other lights near curtains.—15. Do not read in bed,

either by candle or lamp light; place glass shades over gaslights in shop windows, and do not crowd goods too close to them.—16. No smoking should ever be permitted in warehouses, especially where goods are packed or cotton stored.—17. Stove pipes should be at least four inches from woodwork, and well guarded by tin or zinc.—18. Rags ought never to be stuffed into stove-pipe holes; openings in chimney flues for stove pipes which are not used, ought always to be securely protected by metallic coverings.—19. Never close up a place of business in the evening without looking well to the extinguishment of lights and the proper security of the fires.—20. When retiring to bed at night, always take every precaution to see that there is no danger from your fires; that the gas, if you use it, is properly extinguished; and take care that your lights are safe.

POISONS, General, Antidotes and Rules to be Observed.—The first thing to be done, when a person has swallowed a poison of any kind, is to empty the stomach, by taking a teaspoonful of common salt and the same quantity of ground mustard, stirred rapidly in a teacup of water, warm or cold, and swallowed instantly. Next give water to drink, cold or warm, as fast as possible, a gallon or more at a time, and as fast as vomited drink more; tepid water is best, as it opens the pores of the skin, and thus gives the speediest cure to the poisonous article. If pains begin to be felt in the bowels, it shows that part at least of the poison has passed downwards; then large and repeated injections of tepid water should be given, the object in both cases being to dilute the poison as quickly and as largely as possible. Do not wait for warm water—take that which is nearest at hand, cold or warm, for every second of time saved is of immense importance. It has been found that there is hardly any poison which, being diluted in a sufficient quantity with water, may not prove inoffensive. This virtue, coupled with its universal availability, makes it a valuable remedial agent in poisoning.

POISONS, Special, and their Antidotes.—The following are some of the more common articles of poison by which human life is endangered or destroyed, either by accident or design, together with the symptoms, attending their use, and the articles and measures which may be used to destroy their effects and save life. **ALCOHOL.**—*Symptoms*—Confusion of thought; inability to walk or stand; dizziness; stupor; highly flushed or pale face; noisy breathing. *Treatment*—Excite vomiting by large draughts of warm water, by tickling the throat, and by emetics; use stomach pump; pour cold water on head and back of the neck; keep up motion; whip the skin, palms of the hands and soles of the feet, with small cords or rods; give strong stimulants, as ammonia. **AMMONIA.**—*Symptoms*—Strong acrid and burning taste in the mouth; heat in the throat and stomach; nausea; vomiting; great prostration; cold, clammy skin; small, frequent pulse. *Treatment*—Antidote, vinegar and water, or any dilute vegetable acid, excite vomiting; give mucilages, emetics, cathartics, clysters, opiates. **AQUAFORTIS or NITRIC ACID.**—*Symptoms*—Lips, mouth and throat of yellow color; pain, burning and strangulation in swallowing; retching; vomiting of dark-colored fluids, with shreds of mucous membrane; swelling

of the throat; difficulty of swallowing and of breathing; skin cold and clammy; pulse quick and small. *Treatment*—Calined magnesia, carbonate of magnesia, chalk or whiting in water; soap and water; ashes and water; milk; white of eggs; oil and mucilages. Perhaps use a stomach pump. If suffocation is threatened, open the windpipe. **ARSENIC.**—*Symptoms*—Sickness; fainting; burning pain in the stomach; vomiting; excessive thirst; dryness, heat and tightness of the throat; diarrhoea; slow and intermitting pulse; palsy; lethargy; insensibility; convulsions, etc. *Treatment*—Hydrated sesquioxide of iron; emetics of 3 to 5 grs. of sulphate of copper; 10 to 15 grs. sulphate of zinc; ipecac; mustard seed; tickle the throat with the finger or a feather; white of eggs; milk; gruel; flaxseed tea; warm water largely; oil and lime-water; calined magnesia; stomach pump. **BISMUTH.**—*Symptoms*—Metallic taste in the mouth; heat and dryness of the throat; severe burning heat in the stomach and bowels; violent vomiting, sometimes of bloody matter; profuse diarrhoea; pulse small, frequent and irregular; skin cold and clammy; respiration difficult; fainting; convulsions, etc. *Treatment*—Large portions of milk, white of eggs, oil; promote vomiting by large draughts of sickening drinks, and by tickling the throat with the finger or a feather; use stomach pump. **BLISTERING FLIES.**—*Symptoms*—Burning in the throat and difficulty of swallowing; violent pains in the stomach and bowels; nausea; vomiting of bloody mucus; pain in the loins; desire to void urine, and passage of bloody water, with great pain. *Treatment*—Emetics; copious draughts of warm water, milk, mucilaginous drinks; tickling the throat with the finger or a feather. **BLUE VITRIOL (Sulphate of Copper—Verdigris.)**—*Symptoms*—Strong metallic taste in the mouth; belching, violent vomiting and purging; griping pains; cramps in the thighs and legs; frothing at the mouth; headache, giddiness, convulsions, insensibility, etc. *Treatment*—Early vomiting by large draughts of warm water and by tickling the throat; strong coffee, milk, white of eggs, wheat flour and water, mucilages; stomach pump. **CARBOLIC ACID.**—The best antidote for carbolie acid, after the stomach pump, is large doses of olive or almond oil, with a little castor oil. **CARBONIC ACID GAS.**—Found in wells, cellars, mines, etc., and largely given off in the burning of charcoal in close rooms. *Symptoms*—Drowsiness, difficulty of respiration, suffocation; face swelled and more or less discolored; sensation of great weight in the head; vertigo, loss of muscular power, and insensibility. *Treatment*—Admission of fresh air; friction, especially over the lungs; artificial respiration, by inflating the lungs by the mouth or bellows; application of strong stimulants to the mouth or nose; cold water poured upon the head and back of the neck. If the body be cold, a warm bath. **COBALT.**—Of importance from its extensive use as fly-poison, children having eaten it and thereby been poisoned. *Symptoms*—Heat and pain in the throat and stomach; violent retching and vomiting; cold and clammy skin; small and frequent pulse; respiration hurried, anxious and difficult; diarrhoea, etc. *Treatment*—Give freely milk, white of eggs, wheat flour and water, nauseating teas, mucilages, emetics and clysters. **CORROSIVE SUBLIMATE.**—Carelessly made use of

in many families as a bed-bug poison. *Symptoms*—Strong metallic or coppery taste in the mouth; burning heat and constriction of the throat; severe pain in the stomach and bowels; violent vomiting and purging; countenance swollen and flushed, or anxious and pale; pulse small, frequent and irregular; skin cold and clammy; tongue white and shriveled; respiration difficult; fainting, convulsions and insensibility. *Treatment*—Albumen, which is contained in the whites of eggs, abundantly; wheat flour in water; liquid starch, milk, iron filings; excite vomiting early by large draughts of warm water; mustard seed, tickling the throat, and emetics; use stomach pump. **DEADLY NIGHTSHADE.**—Children are sometimes poisoned by eating the berries, which have a sweetish taste. *Symptoms*—Dryness and stricture of the throat; nausea, vertigo, dilated pupils, dimness of sight, laughter, delirium; redness and swelling of the face; convulsions, general paralysis, and insensibility. *Treatment*—Emetics of sulphate of zinc, (10 to 15 grs.,) or copper, (3 to 5 grs.;) large purgatives, and clysters; take vinegar and water, or other vegetable acids, freely; bitter infusions; lime-water; stomach pump; cold water poured on the head, and strong stimulants. **FOOL'S PARSLEY.**—Taken by mistake for common parsley. *Symptoms*—Heat of throat, and thirst; oppression at the stomach; nausea, vomiting, and occasionally purging; cold and moist skin; small and frequent pulse; headache, vertigo and delirium. *Treatment*—Emetics of zinc or copper; warm water; milk; flaxseed or chamomile tea; purgatives, clysters, warm bath, stimulants and opiates. **FOXGLOVE.**—*Symptoms*—Intermitting pulse, vertigo, indistinct vision, nausea, vomiting, hiccough, cold sweats, delirium, syncope and convulsions. *Treatment*—Emetics, followed by strong stimulants, (brandy, ether, ammonia,) opiates, counter-irritation; mustard-seed poultices or blisters to the pit of the stomach; cold effusions. **FUNGUSES.**—Or poisonous mushrooms, (Fungi,) taken by mistake for eatable mushrooms. *Symptoms*—Pain in the stomach, nausea, vomiting and purging; great thirst, colic pains, cramp, convulsions, vertigo, delirium. *Treatment*—Emetics, purgatives, mucilages, acid drinks, stimulants, (ether, brandy, ammonia,) opiates, bitters. **HELLEBORE (Indian Poke.)**—Sometimes used in a poisonous quantity as a dressing for a sore. *Symptoms*—Violent vomiting and purging; bloody stools; great anxiety; tremors, vertigo, fainting, sinking of the pulse, cold sweats, and convulsions. *Treatment*—Excite speedy vomiting by large draughts of warm water, molasses and water, tickling the throat with the finger or a feather, and emetics; give oily and mucilaginous drinks, oily purgatives, and clysters, acids, strong coffee, camphor and opium. **HEMLOCK.**—*Symptoms*—Dimness of sight, delirium; swelling of the abdomen, with pain, vomiting and purging. *Treatment*—Emetics of sulphate of zinc or copper, assisted by copious draughts of warm water, milk, flaxseed tea, chamomile, etc.; stomach pump; pouring cold water on the head and back; stimulants and acids. **HENRANE.**—*Symptoms*—Appearance of intoxication; sickness, stupor, dimness of sight, delirium, great dilation of the pupils, insensibility. *Treatment*—Emetics, with strong stimulants, as sulphate of zinc or copper, tartar emetic or ipecac, with

mustard-seed or cayenne, acid drinks, ammonia, brandy, ether, strong coffee, cold affusion; stomach pump and stimulating the skin. **LIME.**

—*Symptoms*—Heat in throat and stomach, nausea, vomiting, pain in the stomach, violent colic pains, diarrhoea, sometimes constipation. *Treatment*—Vinegar, lemon-juice, or any vegetable

acid, freely; demulcent drinks, opiates, warm bath, etc. **LUNAR CAUSTIC (Nitrate of Silver.)**

—*Symptoms*—Burning pain in the stomach, nausea, retching, vomiting; sometimes extreme purging; cold and clammy skin; small, frequent, and irregular pulse; respiration difficult; fainting, convulsions. *Treatment*—Common

salt in solution abundantly; warm water; irritation to the throat; emetics, warm bath, purgatives, opiates. **MEADOW SAFFRON.**—*Symptoms*—Nausea, vomiting, pain in the stomach,

gripping pains in the bowels, with violent purging; cold sweats; small, frequent and irregular pulse. *Treatment*—Excite vomiting (if not

already free enough) by the use of nauseating drinks, tickling the throat, and emetics, mucilages, opiates, with stimulants. **MONK'S HOOD**

(see Opium.)—*Symptoms*—Nausea, violent vomiting and purging; vertigo, cold sweats, delirium, convulsions. *Treatment*—Excite vomiting

(if not already free enough) by emetics, large quantities of warm water, molasses and water, milk, flaxseed and chamomile teas, etc.; acid

drinks, stimulants, brandy, ether, ammonia, opiates. **MOUNTAIN LAUREL.**—Of great importance, as honey made from its flowers is poison-

ous, and birds which feed upon its buds in winter are likewise poisonous. *Symptoms*—Giddi-

ness, violent flushings of heat and cold, sickness at the stomach, with repeated vomiting and purging; delirium, frequent and weak pulse, extreme

debility, profuse perspiration, convulsions, etc. *Treatment*—Emetics, mucilaginous and nauseating drinks, warm water, or molasses and water,

tickling the throat, purgatives, clysters, strong stimulants, ammonia, coffee, cold affusion, stomach pump. **MURIATIC ACID.**—*Symptoms*—Ex-

treme irritation; burning and sense of strangulation in swallowing; discharge of shreds of

mucous membrane; swelling of the throat; difficulty of swallowing and breathing; skin cold and covered with clammy sweat; pulse quick

and small; lining membrane of the mouth and throat partially destroyed. *Treatment*—Carbo-

nate of magnesia, calcined magnesia, chalk, or whiting in water; soap and water, ashes and

water, white of eggs, milk, oil, etc. Plaster from the wall may be beaten down to a paste

with water and given; carbonate of soda, with barley-water, slippery elm. If suffocation is

threatened, open the windpipe. **MURIATE OF BARYTES.**—*Symptoms*—Pain, burning, weight

in the stomach; vertigo, dimness of vision, ringing in the ears, pain in the head, throbbing in

the temples, paralysis, convulsions. *Treatment*—Epsom or Glauber's salts in solution, emetics,

large draughts of warm water, tickling the throat, flaxseed tea, stomach pump; opiates in

large doses. **MURIATE OF TIN.**—*Symptoms*—

Strong metallic (coppery) taste, sense of tight-

throat, hot cloths to the stomach and bowels, soothing and opiate clysters. **NITRE.**—Some-

times taken by mistake for some other salt. *Symptoms*—Intense pain in the stomach, nausea,

vomiting, profuse purging, bloody stools, severe colic pains in the lower part of the bowels, diffi-

cult breathing, great prostration, fainting, convulsions. *Treatment*—Flaxseed tea, barley-wa-

ter, molasses and water, tickling the throat, emetics, opiates, stimulants, brandy, ether, etc.

NUX VOMICA OR STRYCHNIA.—*Symptoms*—An extremely persistent bitter taste in the mouth,

muscular spasms, great rigidity, limbs fixed and stretched out, jaws spasmodically shut, drowsi-

ness. If the symptoms are prolonged, nausea, vomiting, difficulty of respiration, asphyxia.

Treatment—The *Cannabis India* (a variety of the hemp plant) has been recommended as an

antidote; emetics, to produce immediate vomit-

ing; stomach pump; vinegar, and other vegeta-

ble acids, in water. **OIL OF CEDAR.**—*Symptoms*—Heat in the stomach, followed immedi-

ately by convulsions, with frothing at the mouth; pulsation ceases early. The body is warm a

long time after death. *Treatment*—Vomiting to be excited as early as possible by large draughts

of warm water and other nauseating drinks, by ground mustard-seed, and tickling the throat;

use the stomach pump as early as possible. **OIL OF RUE.**—*Symptoms*—Dryness of mouth and

throat, thirst, heat and pain in the stomach and bowels, headache and delirium. *Treatment*—

Vomiting to be excited as quickly as possible by large draughts of warm water and other nausea-

ating drinks, by ground mustard-seed, tickling the throat, emetics, acids, stomach pump. **OIL**

OF SAVIN.—*Symptoms*—Headache, strong general excitement, delirium, acute pain in the

stomach and bowels, nausea, vomiting, purging, convulsions. *Treatment*—Vomiting to be ex-

cited by copious draughts of warm water, mustard-seed, tickling the throat, and emetics of

sulphate of zinc or copper; acid drinks, mucilages, stomach pump. **OIL OF TANSY.**—*Symptoms*—

Heat in the stomach, followed immediately by convulsions and frothing at the mouth;

pulsation feeble, and soon lost. *Treatment*—Vomiting to be instantly excited by copious

draughts of warm water and other nauseating drinks, mustard seed, tickling the throat, sulphate of zinc or copper, acid drinks, mucilages,

stomach pump. **OIL OF TAR.**—*Symptoms*—

Speedy insensibility; laborious, rattling breath-

ing; coldness of the extremities; contraction of

the pupils; suffusion of the eye; feeble pulse.

Treatment—Vomiting to be instantly excited by

copious draughts of warm water, etc. **OIL OF**

VITRIOL.—*Symptoms*—Extreme irritation, pain,

burning, and sense of strangulation in swallow-

ing; retching, vomiting, discharge of dark-colored

fluids and shreds of membrane from the

stomach; swelling of the throat; difficulty of

swallowing and breathing; cold, clammy skin;

quick and small pulse. The lining membrane of

the mouth and throat is partially destroyed, and

is of a white color. *Treatment*—Carbonate of

magnesia, calcined magnesia, chalk or whiting,

mixed with water, soap, or ashes and water;

lime from the plastered wall beat into a paste

with water, white of eggs, milk, oil; perhaps

the stomach pump, but with great care. If suf-

focation is threatened, open the windpipe. **OP-
IUM.**—*Symptoms*—Giddiness, drowsiness, in-

sensibility, stupor; pulse at first quick and irregular, and breathing hurried; afterwards breathing is slow and noisy, and the pulse slow and full. In favorable cases there is early nausea and vomiting. *Treatment*—Excite instant vomiting by mustard-seed, copious draughts of warm water, and tickling the throat; give sulphate of zinc (10 to 15 grs.) or copper (3 to 5); use the stomach pump early. Give strong stimulants, ether, brandy, ammonia, strong coffee and tea. Pour cold water on the head and back of the neck, and whip the skin, the palms of the hands, and soles of the feet with small cords or rods. **PHOSPHOROUS.**—Hot taste of garlic or onions in the mouth, violent pains in the stomach, nausea and vomiting, followed by great excitement of the arterial vessels; convulsions. *Treatment*—Fill up the stomach with magnesia and water; give emetics and nauseating drinks to keep up the vomiting. **OXALIC ACID.**—Generally taken accidentally from its resemblance to Epsom salts. *Symptoms*—Hot, burning taste in swallowing; immediate and constant vomiting, the matter thrown up being of a greenish or brownish color, and extremely acid; sometimes severe pain; collapse; pulse small, irregular, and scarcely perceptible; numbness and spasms. *Treatment*—Carbonate of magnesia, calcined magnesia, chalk or whiting, made into a cream with water, and administered freely; lime-water with oil; emetics, mucilages; stomach pump. **POTASH.**—*Symptoms*—Strong acid taste in the mouth; burning heat in the throat and stomach; sometimes vomiting and purging, with colic pains; cold, clammy skin; small, frequent pulse. *Treatment*—Vegetable acids, vinegar, lemon-juice, or tartaric acid in water; emetics, clysters, opiates. **PRUSSIC ACID.**—*Symptoms*—Instant sensation of weight and pain in the head; nausea, quick pulse. In large doses, instant insensibility, stupor, convulsions; loss of pulsation, very slow and convulsive breathing. *Treatment*—Application of strong ammonia to the nostrils, and stimulating liniments to the chest; cold water poured upon the head and spine; chlorine gas; a dilute solution of chloride of soda or lime. **POISON IVY.**—A running vine which is found covering walls, shrubs, trees, and in meadows. This plant, by contact, and upon many without contact, produces violent erysipelatous inflammation, particularly with the face and hands. The symptoms are itching, redness, burning, swelling, watery blisters, and subsequently peeling of the skin. These effects are experienced soon after exposure, and usually begin to decline within a week. *Treatment*—Bathe the parts freely with spirits of nitre. If the blisters be broken, so as to allow the nitre to penetrate the cuticle, more than a single application will rarely be necessary. Another remedy is to take a handful of quick-lime, dissolve it in water, let it stand half an hour, and then paint the poisoned parts with it. Three or four applications will generally cure. Another is to bathe the affected parts well with sweet (or olive) oil, taking internally 2 tablespoonfuls 3 times a day. Anointing the face and hands with sweet oil will prevent poisoning by the ivy. **POISON DOGWOOD.**—A small but beautiful shrub or tree, from 10 to 15 feet high, having a dark gray bark, its smaller branches of a lighter color, and its extreme twigs red. Its effects are similar to those of Poison Ivy, but more powerful. The

poisonous principle is most energetic during the burning of the wood. Symptoms and treatment the same as for the ivy. **SUGAR OF LEAD OR WHITE LEAD.**—*Symptoms*—A burning, prickling sensation in the throat, with dryness and thirst; uneasiness at the pit of the stomach; nausea, vomiting; colic pains, constipation of the bowels, cold skin, feeble and irregular pulse, great prostration of the strength, cramps, numbness, paralysis, giddiness, torpor, insensibility. *Treatment*—Epsom or Glauber salts, (sulphates of magnesia and soda,) mucilages, milk, white of eggs, wheat flour with water, emetics; stomach pump. **TARTAR EMETIC.**—*Symptoms*—Nausea, severe vomiting, hiccough, burning heat and pain in the stomach, colic pains, violent purging, small, frequent and hard pulse; cramps, vertigo, fainting, and great prostration. *Treatment*—Tea made of oak bark or Peruvian bark, strong green tea, mucilages, warm drinks, opium, opiate clysters. **TOBACCO.**—*Symptoms*—Severe nausea, vomiting, headache, sudden sinking of the strength, cold sweats, convulsions. *Treatment*—Emetics, copious draughts of warm water, tickling the throat with the finger or feather, purgatives, acid drinks, stimulants, brandy, camphor, etc. **THORN APPLE OR STRAMONIUM.** *Symptoms*—Vertigo, delirium, stupor, convulsions, paralysis, cold sweats, feeble and irregular pulse. *Treatment*—Emetics of sulphate of zinc or copper, mustard-seed, tickling the throat, stomach pump. **WHITE VITRIOL OR SULPHATE OF ZINC.**—*Symptoms*—Bitter taste in the mouth, with sensation of choking; nausea and severe vomiting; pain in the stomach and bowels; purging, difficult breathing, quick and small pulse, coldness of the extremities. *Treatment*—Albumen, white of eggs, wheat flour and water, milk abundantly, infusions of tea, oak bark, etc.; emetics, purgatives, and opiate clysters.

POISONOUS DRUGS, Labels for.—Very many cases of accidental poisoning would be prevented if druggists would print labels that would not only give the name of the poison and the dose, but would also give the antidote. A transcript for such a label might be as follows:

LAUDANUM—POISON.

Dose—For an adult, from twenty to forty drops. Should not be given to children except in very small doses.

Antidote.—In case of accident, use active stimulants. Coffee, tea, brandy, and ammonia.

THUNDER STORMS, Safety During.—
1. The opening of the doors and windows of a house, or the keeping of them closed, will in neither case influence the passage of the electric current.—2. Sitting by a window is not only as safe, but probably more safe, than some other parts of the house. It is, however, less safe to sit near the fireplace. The chimney, being the most prominent part of the house, is the point generally on which the lightning strikes. The best place is to sit or be as near the middle of the room as convenient.—3. If in bed, and the bed be as far as any other part of the room from the fireplace or its metallic furniture, it would probably be safer to remain in it during the storm.—4. It is often recommended to go down stairs, it being supposed that a cellar, being below the surface of the earth, is the safest place of

refuge. This is a popular error, for it must be understood that the lightning rises out of the earth as well as proceeds from the clouds; the cellar, therefore, or the ground floor, may accordingly, in some cases, be nearer the point at which the electricity ascends; and the effects are as violent at the place from which the electricity takes its departure, as at the place which it strikes on its arrival at the earth.—5. Lying down, as a general rule, is a safer position than an upright attitude.—6. When out of doors, avoid standing under trees, especially tall trees, to escape from the rain during a thunder storm; but boldly expose yourself to the wet; and if on high ground where there are no trees, the human body itself becomes a good conductor, and the safest course under these circumstances, however inconvenient it may be, is to lie down, instead of maintaining an erect position.—7. Avoid standing close to any metallic bodies, as lead pipes, iron railings, etc.

LOCKJAW.—The symptoms are, at first, difficulty and uneasiness in turning the head, with inability to open the mouth easily; gradual closure of the jaws with great firmness, followed by difficulty in swallowing and pain in the breast, shooting to the back. Remedies for the prompt and permanent cure of this disease are unknown. The spasms can be controlled by the use of chloroform or ether, taken into the stomach or by inhalation. The bowels should be freely moved by warm-water injections. Rapid friction of the whole body by attendants will be advantageous. It is said that the application of spirits of turpentine to the face and neck will effect a cure. When the jaws are firmly closed, the drawing of a tooth will allow the passage of food; but failing this, food in a fluid state can be passed by injection into the rectum. These requirements, necessary to the nourishment of the patient, can be avoided if, when the disease is noticed coming on, two small pieces of soft wood are placed between the upper and lower jaw, one on each side, so that they may be kept asunder.

SCALDS.—See *Burns*.

STINGS OF BEES AND WASPS.—

1. These stings, though very painful, are not dangerous to a healthy person, unless in the mouth, throat, or eyelid. The sting of a bee, being barbed at the end, is always left in the wound, and should, when possible, be carefully removed. That of a wasp is pointed only, so that they can sting more than once, which a bee cannot do. If, after the sting of the bee is extracted, the wound be sucked, very little inflammation will follow; and if spirits of ammonia be then applied, a prompt healing will result.—2. Common whiting, moistened with water, and applied immediately, and in a few minutes washed off, will prevent pain and swelling from following the sting of a bee or wasp.—3. The slice of a common onion rubbed on the sting of a wasp, or, if in the throat, chewed slowly and the piece swallowed, will result in a certain cure. See *Bites*.

SUFFOCATION FROM NOXIOUS GASES, E—Remove to the fresh air; dash

cold vinegar and water in the face, neck, and breast; keep up the warmth of the body; if necessary apply mustard poultices to the soles of the feet, and try artificial respiration as in *Drowning*.

SUNSTROKE.—In every instance where one is found fainting in the street on a hot day, the first thing is to remove the person to as cool and shady a place as can be found, and, if possible, to where a draft of air is blowing at the time. Bystanders and mere curious idlers should be kept from crowding around. It should be understood that there are two morbid conditions resulting from excessive heat. These differ somewhat in their symptoms, and require a somewhat different treatment. The first of these occurs during hot weather, after undue exertion on the part of the person thus affected. The man is faint, perhaps unable to move, although he can generally be roused; he has a feeble pulse and a cool and moist skin. Here there is simply a loss of nervous power, and relief is promptly afforded by removing him to a cool, shady place, applying cold water or ice to the head, and administering iced brandy and water, iced wine and water, or other stimulant. In the other and more fatal form of this affection a different set of symptoms show themselves. Here the patient suddenly falls to the ground, completely unconscious, his skin is pungently hot and dry, his breathing hurried, convulsions are not uncommon, and, if proper treatment be not promptly resorted to, death soon takes place. In this, also, the patient should be promptly removed to a shady and cool spot, perfectly private, so that the crowd may be kept off without fail. His clothing should be stripped off, and his whole body should be rubbed with ice from head to foot, and pieces of ice should be kept under the arm-pits. This should be steadily persevered with until the patient is restored, or until a doctor arrives, or until it is plain that the patient is beyond recovery.

THROAT, Foreign Bodies in the.—Persons are frequently in danger of suffocation from fish-bones, pins, etc., which stick to the throat. The moment an accident of this kind occurs, desire the patient to be perfectly still; open his mouth, and look into it. If you see the obstruction, endeavor to seize it with your finger and thumb, or a long, slender pair of pincers. If it cannot be got up, and is not of a nature to do any injury in the stomach, push it down with the handle of a spoon, or a flexible, round piece of whalebone, the end of which is neatly covered with a roll of linen, or anything that may be at hand. If you can neither get it up or down, place six grains of tartar emetic in the patient's mouth. As it dissolves, it will make him excessively sick, and, in consequence of the relaxation, the bone, or whatever it may be, will descend into the stomach, or be ejected from the mouth. If a pin, button, or other metallic or pointed body, has been swallowed, or pushed into the stomach, make the patient eat plentifully of thick rice pudding, and endeavor to prevent him from going to stool for at least twelve hours.

APIARY.

NATURAL HISTORY OF THE BEE.

—A community or family of bees is generally understood to contain from twelve to thirty thousand individuals. About nine-tenths of the whole number are common or working bees, and the remaining tenth male or drone bees, and at the head of the commonwealth there is a personage who is entitled "the queen" or mother bee.

THE QUEEN, OR THE MOTHER BEE.—This important individual differs in her appearance and her functions from all the other members of the family. She is darker, longer, and more taper in figure than the common bee; her legs are longer, although her wings are shorter, and underneath her color is tawny or yellowish brown. She is furnished with a sting like the working bees, which, however, she uses, it is said, only on very important occasions. She is the mother of the whole community; all the working bees, the drones, and those intended to be future queens, proceed alike from her eggs, of which, according to some writers, she has sometimes been known to produce a hundred thousand in one year; a number not too large when new swarms are considered, as well as the deaths and casualties continually occurring among the members of the hive. The mother bee not only occupies the maternal relation to her immense family, but exercises over them an influence analogous to that of a sovereign, a circumstance from which her appellation of queen is justly derived. On her presence depends not only the prosperity but the very existence of the bee nation; and with this influence exercised by the queen herself, a corresponding instinct is in operation in all the then members of the community, which may justly be compared with what we understand by the term "loyalty." The absence of the insect monarch, whether from death or any other cause, speedily entails disorder, confusion and anarchy; all labor is terminated, and the bees disperse.

THE WORKING BEES.—These are distinct, both from the queen and the drones, being smaller, and having the charge of making incessant provision for the well-being and sustenance of the whole family. Their daily toils are an illustration of what is called the "division of labor," the value of which was unknown to man for centuries after the bee had been taught to avail herself of the system. Some of the workers occupy themselves in making the combs from the wax, which is a natural secretion; others keep the eggs warm which are to produce future members of the hive; others engage in feeding the queen and the larvæ or young brood; others take charge of the ventilation and cleansing of the hive; some take on them the duty of guarding the common habitation from attack, and warning its inhabitants of impending danger; others wing their way to the fields and gardens, and collect with indefatigable industry the farina and honey that are so imperatively required.

THE DRONE BEES.—These are larger, darker,

and more hairy than the workers; they have no stings, their motions on the wing are heavier, and the sound of their humming so much deeper as to give rise to their characteristic appellation. The drones take no part in the process of collecting or storing honey, nor, indeed, in any of the various industrial occupations in which the workers engage. Neither their instincts nor organization adapt them to these offices; but Infinite Wisdom has called them to the performance of functions no less important. Some highly interesting and marvelous instincts are illustrated in the history of the drones. They are, as already stated, unproductive—that is to say, they do nothing to add to the wealth of the community. As mere consumers, the drones seem at certain periods to be regarded by the working bees as an expensive as well as a useless class, only worthy of being destroyed or expelled. Accordingly, if the necessity of swarming ceases, and no royal cells are constructed, or the royal brood have been prematurely destroyed, the instinct of the workers prompts them to the expulsion of the drones, against whom a fierce war is declared, ending in their extermination. On the other hand, if the queen bee is forcibly taken from the hive, the instinct of the workers leads them to spare the lives of the drones, who continue to be boarded and lodged at the public expense, in consequence, apparently, of the presumption, that although the cost of their support may be considerable, circumstances may arise to render the very existence of the community dependent upon them.

SWARMING.—The instinct that prompts these wonderful insects to issue from the hive and establish new colonies, is called into exercise when the hive contains too great a number of inhabitants, and there is not a sufficient space either for breeding young bees or storing honey. The crowded state of the hive renders emigration indispensable, and arrangements are made for the important event. Royal cells are formed, and young queens are anxiously and tenderly fostered in them, since without them emigration is impracticable. In these circumstances the bees cease to gather honey, and a period of idleness occurs which terminates with swarming. The owner of the bees, therefore, must either multiply the number of his hives, by allowing them to swarm, or he may prevent the swarming by furnishing additional accommodation for breeding and collecting honey; for it has been found that bees can be controlled perfectly in this matter, divided as much as the owner finds desirable, or swarming prevented entirely if he wishes it.

ARTIFICIAL SWARMING.—This should be undertaken only when honey is abundant in the fields and the nights warm. To divide them, have a hive at hand of the same size and pattern as your others. Then from four hives take each two frames and place them in the new hive, supplying their place in the old with empty frames. Then move a hive which you have not disturbed, a rod or more away to a new place, and place

the new hive where that one stood. This should be done in the middle of a fine day, when many bees are absent in the fields. These will come in loaded to their old place, and find it strange; and as it contains stores and young bees hatching, and eggs from which to rear another queen, they will at once proceed to rear one, and remain and work as contented as ever. This process may be repeated every two weeks until you have secured sufficient increase. The hives from which you take the combs, and the ones which you move to a new place, will lose so many bees that they will not think of swarming, but will energetically make up their loss, and be better than if nothing had been taken from them. This is the safest of all ways to divide bees, and can be safely practiced by beginners.

TO PREVENT SWARMING.—Immediately after the issue of the first swarm open the hives, (you must have movable frames for this,) destroy every royal cell but one. If at the end of five days this has not hatched, look over the combs again, and destroy every royal cell that may now appear, excepting the one saved at first. But if the oldest of the young queens is allowed to hatch and begin piping before anything is done, the fever of swarming will rise to such a pitch that you cannot allay it, and the old hive may even be left destitute. The best way is to make the first swarm an artificial one before or soon after queen cells are started. Then at the end of nine days, destroy all cells but one, as above. To prevent first swarms, clip the wings of the queens, and put a "queen yard" in front of the hive—a shallow box some two feet square, with edges of tin projecting inward, so that no bee can get out and away from the hive without flying. This will, of course, prevent the escape of the queen, and swarms will return.

SWARMS GOING TO THE WOODS.—may be prevented from doing so by keeping the hive shaded and cool and close to the bottom board, except a half inch in front. If a difficult case, set in the cellar for 48 hours, and give, perhaps, a pound of honey.

ESTABLISHMENT OF AN APIARY.—The proper time for this purpose is about February, or the beginning of March, as the stocks have then passed through the winter in safety; the combs are then empty of broods, and light of honey, and may be removed with safety and ease. Stocks should be selected by a competent judge, as the weight alone cannot always be relied on; such as weigh 12 lbs. and upwards, the number of bees being also observed, and that they are well combed to near the bottom, may be safely chosen. As soon as they are brought home they should be set in the *bee house*, care being taken to keep them dry and free from the attacks of vermin. The best time for removing stocks is in the evening. *Swarms* should be brought home the same evening they are purchased, for if delayed a day or two the combs will be worked, and subject to be broken in removing.

HOW TO MAKE A HIVE.—Take any good, soft wood lumber—pine is best—and dress it upon both sides. The boards should be 15 inches wide and a plump inch in thickness after it is dressed. For the sides of the hive, cut the boards into pieces 21 in. in length; for the back end, 13½ inches, and for the front end the same length, and 11 inches wide. The end pieces should be rabbeted 1 inch by ¾ upon the inside

of their top edges to receive the frames. Now nail these pieces together, and we have a box 13½ by 19 inches upon the inside, with neither top nor bottom. The bottom board is 13½ by 26 inches, is fitted inside the hive, the back end placed 4 inches from the bottom, forming an inclined plane, and extending in front of the hive, making a convenient alighting board for the bees. An inch auger hole is bored in each upper corner of the bottom board, and covered upon the under side with wire cloth, for ventilation. A strip 13½ by 3 inches is fitted in the aperture at the front of the hive. *The Movable Frames* are each composed of 4 pieces—the top piece being 1 by 1¼ inches by 20 inches long; the end pieces are 1½ by 1 inch, and 10¼ inches in length; the bottom piece 1 by ½ inch, and 18 inches in length. The bottom edge of the top piece is beveled to an edge; the end pieces nailed to it an inch from each end, and the bottom piece is nailed on the end of these. This gives us a frame 17 inches long by 10 deep, inside measurement. Nine of these will go into the hive, leaving a ½ inch space all around, and between each frame. This gives us a hive holding 2,295 cubic inches in the main apartment. *The Cap of the Hive* should be made 16 by 21½ inches and 9 inches in depth; nail upon top of this a board 20 by 26 inches for a cover. Now we have a cap which will fit over the top of the hive, and is held in place by strips an inch square, nailed upon the outside of the hive, ½ an inch below its top. The form of this hive is similar to that used by many of the most successful bee-keepers in our country.

ANOTHER EXCELLENT BEEHIVE.—The principal object in making a beehive should be to make it a non-swarm, and secure the largest amount of surplus honey in the best shape for the market. This point can be attained by the use of a device called a "queen-yard," made as follows: Nail together strips of boards to make a box 18 or 20 inches square, by 3 or 4 inches deep, with a floor of thin boards, except a strip 4 inches wide, which should be of wire-cloth, for sifting out dirt, and for ventilation. Fasten strips of tin 2 inches wide around the inside at the top, parallel to the floor; and make an opening in the side next to the wire cloth, in the floor, corresponding to the entrance of the hive. Paint the upper side of the tin some light color. In swarming-time place this yard in front of the hive. Previously examine the hive, and clip the wings of the queen. When a swarm is disposed to issue, all the bees are obliged to pass through this yard, and the queen, being unable to fly, or crawl over the projecting tins, will return to the hive, where the bees will soon follow her. To prevent their raising a young queen which can fly, the hive must be opened and all queen cells cut out once a week, unless it is desirable to supersede the old queen, in which case one cell may be left; and after she has hatched and commenced laying, which will be in about 10 days, find her and clip her wings as above directed. The old queen should be removed just before the young one hatches. The inside of the hive is simple, consisting of 8 movable frames, supported by a device which clears them from any patent. The frames are 11 by 18 inches, inside measurement, and are held in place by a piece of hoop-iron fastened on the outside of one of the end pieces, near the bottom, and bent at a right

angle to project under the end of the frame $\frac{1}{4}$ of an inch, to form a sort of hook. There should be space enough between the hook and end of frame to allow it to slip over a piece of hoop-iron fastened across the bottom board of the hive, which has a slight channel cut under it to give the requisite room. One end of each frame being thus secured they remain perpendicular, and are kept at the right distance from each other— $\frac{1}{4}$ of an inch—by nails partially driven in the sides of the frames. There are various other items in the construction, such as ventilators, etc., which I cannot take room to describe. At the sides and top of these frames there is space enough to place surplus boxes of over 100 lbs. capacity, holding from $2\frac{1}{2}$ to 4 lbs. each. Top boxes are placed directly on the frames; side boxes with the partially open ends against the main combs. If the honey is designed for home consumption, extra frames may be used instead of boxes. A large box, which is joined at the corners with hooks, incloses the whole, and can be readily opened at any time. The space devoted to boxes in summer can be filled with dry hay or straw, and the hives remain safely on the summer stand during winter. Those who prefer to increase their colonies by natural or artificial swarming to securing large amounts of surplus honey, can use these frames to advantage by omitting the extra space designed for boxes, and inclosing with a box just large enough to accommodate the frames, leaving sufficient room to prevent the bees from waxing the outside combs fast to the hive.

POSITION OF THE HIVES.—For an apiary, or even a single hive of bees, the best position is a sheltered place on a low level, instead of an elevated and exposed situation, and as free as possible from damp, noxious smells, and disturbing sounds. A plot of well-kept grass, or a space covered with dry gravel, is frequently very desirable. There seems to be no definite rule as to the best position for the hive as regards the points of the compass; the bees have been found to thrive whether their abode fronts the south, the north, or any intermediate point. On this subject so much depends on the locality, the climate, and various other considerations, that it is difficult, or rather impossible, to prescribe any rule of universal application.

CHANGING HIVES.—The best time to change bees without loss from common to movable frame hives is about the season of swarming, which varies with the latitude and climate. About the time when swarms are expected naturally, take the hive which you wish to transfer, and, blowing a little smoke into the entrance, remove it a rod or more from its stand, leaving an empty box or hive in its place, into which the bees that are out in the field may gather. Invert the hive which you have moved, and put over it an empty box or hive, as near the same size and shape as possible, and stop all holes or cracks between the two with grass or weeds that may be at hand, leaving no hole large enough for a bee to escape. Then with sticks keep up a sharp drumming on the bottom hive, at which the bees, alarmed, will fill their sacs with honey and mount into the upper hive. In from 20 to 30 minutes most of the bees, with their queen, will be in the empty box on top. The beginner need not fear driving too many; let all go that will. Then carefully set the box containing the bees in

a shady place, and take the old hive back to the place where it stood. While you have been driving, many bees will have come back to their home, and finding it gone, will be roaming in and out of the empty hive in distress. These will at once rush into the old hive when it returns, and gladly adhere to it. Then remove it to a location some yards off, when, as it contains many hatching bees and eggs, the bees will at once rear a new queen to replace the one just driven out, and in a short time be as prosperous as ever. Now place your new movable comb-hive, with its entrances all open, on the old stand, and spread a sheet before it; on this sheet empty the bees you have driven into the box, and they will at once take up a line of march for the entrance of the new hive; if they gather there, brush a few in with a wing or twig, and they will call the others, who enter in a body and accept the new hive as their home.

FOOD FOR BEES.—It must be sufficiently obvious that no artificial food can be so acceptable or suitable to the bee as pure honey—the kind of nutriment which the instinct of the creature itself induces it to provide; refuse honey may therefore, in preference to any other kind of food, be given to the bees whenever it is really required; but in many instances artificial food is supplied. In spring it is recommended by competent judges that even strong hives be fed, inasmuch as they are stimulated by the increased temperature which the feeding occasions; but that there ought to be no feeding—unless there exists an unavoidable necessity for it—till the hive exhibits some degree of animation; for the bees often are tempted to go forth prematurely in quest of flowers, and numbers in this way perish, being unable to return home. As already observed, honey furnishes the best because the most natural element, and it may very properly be rendered more liquid by a slight admixture of water; but various substitutes for honey have been resorted to, and by no means unsuccessful.

BEE FEEDER.—An excellent bee feeder, and one not covered, I believe, with a patent, is made thus: Make a wooden box without a bottom, somewhere about 8 by 10 inches, and 2 inches deep. Nail over the top a piece of good muslin, leaving it loose enough to sag down in the middle nearly or quite to the lower edges of the sides of the box—if intending to use it on the top of box hives, it ought not to hang down quite so low. Now you can set this feeder, muslin side uppermost, on the top of a box hive, having opened the holes, or directly on the tops of the frames of a movable comb hive. Pour the honey or syrup on the concave muslin, and the bees will take it from the under side. Cover the whole apparatus so as to secure it from robbers.

PASTURAGE FOR BEES.—Districts of country where grain is extensively cultivated are less favorable to bees than those in which fields abounding with wild flowers exist, and where clover, peas, beans and similar plants are largely grown. The blossoms of fruit trees of all kinds, and the flowers of the broom, the furze, and the bramble, all afford the bee great advantages for the collection of honey and farina. The planting, too, in the neighborhood of the hives, of the crocus, the blue hepatica, the black hellebore, and mignonette, is also found to be favorable.

SUPPLY OF WATER.—When the season is dry, and during the period of breeding, water is necessary to the bees, in order not only to the secretion of wax, but the due preparation of honey and farina. If there be no natural supply of the needful element within easy reach of the little architects, a shallow vessel must be placed near them, which may be frequently filled to the brim. As a precaution against the danger of drowning some of the bees, a thin piece of wood, perforated with holes, may be placed so as to float on the surface, covering every part of it. The holes will be so many wells from which the bees can draw their supplies without the danger of their falling into the water.

SUNSHINE AND SHADOW.—Too much heat is always injurious to bees; they ought not to be left exposed to the sun in sultry weather. It renders the insects extremely irritable, and exposes the combs to the danger of being more or less softened, and even melted. It is very important, therefore, to protect the hive by sheltering it from the direct rays of the sun. A screen adapted to the purpose is very suitable, or a mat, which may be thrown over the hive. In our opinion the screen is to be preferred, as causing a grateful shade, and at the same time permitting a better ventilation. On this subject an excellent writer remarks, that bees "delight best in thick forests, because there they find a uniform temperature and a propitious shade;" and he adds, "It is a mistake to suppose that bees exposed to the sun produce the earliest and strongest swarms; I have often experienced the reverse. Bees like the shade when working, and the sun only when in the fields."

ENEMIES OF THE BEES.—Domestic fowls are destroyers of bees, and also some birds, from whose attacks as they range the fields at a distance from the hive they cannot be protected. Among these is the titmouse, or blue tom tit, which devours the bees, and feeds his young with them; and in winter is said to endeavor to force his way into the hive itself. Mice are often very troublesome, and even rats sometimes make their way into the hive. Slugs and snails often occasion much trouble; and especially in warm summer evenings, the attacks of wasps and hornets are a great annoyance to the bees. In all these cases care and vigilance can do much. Wasps' nests ought to be destroyed wherever met with; insects of all kinds, such as earwigs, woodlice, ants, etc., should be cleared away. In a word, the hives and stands for them ought to be kept as clean and neat as possible.

WINTERING BEES.—A good plan is to quilt a mat of cotton batting, and place it on the frames upon a cross strip, so securing winter passages each side between the frames, and the quilt against which the bees cluster and winter well out of doors, the side honey-cases filled with cut straw, or some other absorbing material. In box hives an upper chamber or box should be filled with straw, and the entrance contracted to keep out mice. To winter bees successfully, only three things are necessary—ventilation in the right place, plenty of food where they can reach it, and sufficient bees in number to maintain the requisite animal heat. In colder latitudes, bees are most safely wintered in dry, dark cellars, and should be set on shelves, with the entrance closed with wire cloth. The holes through the top of box hives should be covered with wire

cloth, and the hives inverted and set on $\frac{3}{4}$ inch strips. They should not be put into the cellar until cold weather comes on in earnest. A warm and pleasant day should be chosen to put them out again, for they will be attracted by the light and fly out, when, if it be chilly, some will perish.

REARING QUEENS.—Premising that you use movable frames, make a number of small frames, as near 4 or 5 inches square as may be, to just fit inside one of your large ones. Fill with clean worker comb—that which has been frozen is the best, because the eggs of the moth will have been thus destroyed—and put the large frame containing these small ones in the middle of some stock with a fertile queen from which you wish to breed. Provide also some small boxes on the plan of a simple movable frame hive, with loose top and rabbeting for the frames, and just the size to accommodate three or four of them. When eggs have been deposited in the combs, set up one of your small boxes with them as a hive in miniature, and confine in it between a pint and quart of bees. They will immediately construct queen cells, and may then be opened. In this way any number of queens may be provided.

HOW TO CHANGE COLONIES OF BLACK BEES TO ITALIAN.—Since the queen is the mother of all the bees in the hive, and deposits all the eggs, it follows that they will all be like her. If then the queen be taken from a colony of common bees, and an Italian queen be put there in her stead, all the eggs thenceforth laid will produce Italian bees; and as the life of the worker bee is short, in from two to three months the old bees will all have died out, and be replaced in greater numbers by the beautiful Italians. These Italian queens are now reared for sale by scientific apiculturists, and sent to any part of the world with perfect safety. If a pure queen purely impregnated is purchased and introduced to any colony of black bees, an Italian stock is secured in the best and least expensive way.

THE SAFEST WAY TO INTRODUCE AN ITALIAN COLONY.—Take away the queen of the colony to which the Italian is to be given. To find her most easily, open the stand in the middle of a fine day, when many bees are absent from the hive. Disturb the bees as little as possible, and have an assistant to look on one side of the frame while you examine the other. Look first on the combs near where the bees cluster, as the queen is apt to be there. As soon as you have found and killed her, put the Italian queen, with three or more of the bees that come with her, into a wire cage which always accompanies her when sent, and lay this over the frames near the cluster, or, if the weather be cool, the cage may be laid between two frames. Leave her there 48 hours, and then, without disturbing the bees, withdraw the stopper, and allow the queen to go into the hive at her pleasure.

BEE SWAX, To Whiten.—In March or April melt yellow wax without boiling; then having several pewter dishes ready, dip the outside bottom of each dish in fair water; then dip them into the wax, and take up a very thin plate of wax—the thinner the better; take them off, and expose them upon the grass to the sun, air, and dews, until they be milk-white, turning them often.

BEE SWAX, To Bleach (Italian Method.)—

DICTIONARY OF EVERY-DAY WANTS.

yellow wax is first melted in a kettle, and is dipped out into a long tin vessel that will hold two or three gallons, and which has a row of small holes, about the diameter of a knitting-needle, in the bottom. This vessel is fixed over a cylinder of wood 2 feet in length and 15 inches in diameter, which is made to revolve like a grindstone, in one end of a trough of water, 2½ feet in width, 10 to 15 feet in length, and 1 foot

in depth. As the melted wax falls in small streams on this wet revolving cylinder, it flattens out into a thin ribbon, and floats off toward the other end of the trough of water. It is then dipped out with a skimmer (that may be made of osier twigs,) spread on a table with a top made of small willow rods, covered with a clean white cloth, and then exposed in this way to the sun until bleached.

CARPENTER AND BUILDER.

BUILDING HOUSES, Hints on.—1. Build solid, substantial foundations laid up in cement or mortar, with footing-course projecting 6 inches on either side, as this is a preventive against rats burrowing under the foundation and entering the house from the outside. Plaster the walls on the outside flush and smooth with cement where coming against the earth; this prevents the face-water from percolating through the joints of the walls and making your cellar wet and damp. If it is a clay soil, and your house is situated on a side hill, sub-drain your cellar, lead the drain out to the lowest part of your ground, and let it discharge on the surface. If your ground slopes in all directions away from the house, the above precaution is not necessary.—2. Do not support the interior partitions to your house upon brick piers in the cellar, with a timber girder running thereon. This is very faulty construction, as it admits of the shrinkage of the timber girder and the floor-beams above it, producing settling and cracks throughout the building. These interior partitions sustain full as much, if not more, weight than the exterior walls, and therefore should have eight or twelve-inch walls under all bearing partitions. Build these supporting walls up to the top of the floor-beams, so as to permit the stud partitions above to rest directly on the beams. All stud partitions shrinkage of the beams. All stud partitions above the first story should, if possible, rest on the heads of the partitions beneath, thus again avoiding shrinkage and consequent settling.—3. It is false economy to use light floor-beams, as their constant vibration when walked upon is excessively annoying and unpleasant. They should never be placed more than 16 inches apart between centres, and for ordinary spans should be at least 2 by 10 inches, and 2 by 11 and 2 by 12 inches for spans not over 18 feet. All beams should be thoroughly cross-bridged, and all floors should be deafened. This deafening is not only for the purpose of deadening the sound, but it also prevents any water that may be spilled on the floor above staining the ceiling underneath. It also prevents the rapid spread of fire.—4. All ceilings should be cross-furred, the purpose of which is to bring the ceiling to a true level and to prevent cracking.—5. It is a very good plan to have all doors hung on loose-jointed butts, so as to allow of their being easily set off the hinges, should they require at any time to be eased or planed out. This is also a

great convenience on occasion of an entertainment, as the doors can be removed and stored away, and the house thoroughly thrown open to the company.—6. All first-class houses should have double floors. The first flooring may be of mill-worked boards, and the finishing floor (which may be of any wood desired) should not be put down until the plastering is complete, and the base and casings to the door are up; by adopting this plan a very thorough floor is obtained, as we avoid all the dirty and wet work of the plasterer, and the wear and tear incident to the passing to and fro of the workmen. The effect of the shrinkage of the base from the floor is also avoided, giving the floor a better finish. It makes a much more rigid floor, and ties the building together much better, to lay the second floor at right angles with the first floor.—7. Always see that the plastering is carried down to the floor, and by this means avoid as far as possible having any space at the back of the base-board, wherein cockroaches and other vermin may find refuge. Also plaster behind panel-backs, under windows, and where the sub-sill rests on the stone sill, to prevent the cold air and snow from drifting in.—8. In wooden houses, be careful to have all of the cappings and tops to the windows and doors covered with tin, the tin to be carried up underneath the outside covering or clap-boarding.—9. In conclusion, put yourself at the outset in the hands of a good, thorough architect, and be governed by him in the matter of construction. Listen to his suggestions, he has had much more experience than you, and what your building will cost, and go to whoever seek to persuade you that they can produce the same amount of room at much less cost than this can only be done by the process of skinning which means leaving out those matters which are contained in the above suggestions, and many more, all of which greatly contrive the durability of the house and the comfort of existence within it. In this, as in other cases, the best economy does not consist in the fancied saving of money at the outset, but in the adoption of wise plans.

BRICK-MAKING, Application of.
and Small Coke of Gas Works for-
10 to 12 parts of the ash and cinders
of lime, after having first taken care
the small pieces of coke, so as to be
than about 5 centimetres cubical size,
is mixed with some water, and ne-

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CARPENTER AND BUILDER.

BUILDING HOUSES, Hints on.—1. Build solid, substantial foundations laid up in cement or mortar, with footing-course projecting 6 inches on either side, as this is a preventive against rats burrowing under the foundation and entering the house from the outside. Plaster the walls on the outside flush and smooth with cement where coming against the earth; this prevents the surface-water from percolating through the joints of the walls and making your cellar wet and damp. If it is a clay soil, and your house is situated on a side hill, sub-drain your cellar, lead the drain out to the lowest part of your ground, and let it discharge on the surface. If your ground slopes in all directions away from the house, the above precaution is not necessary.—2. Do not support the interior partitions to your house upon brick piers in the cellar, with a timber girder running from pier to pier, and the floor-beams resting thereon. This is very faulty construction, as it admits of the shrinkage of the timber girder and the floor-beams above it, producing settling and cracks throughout the building. These interior partitions sustain full as much, if not more, weight than the exterior walls, and therefore should have eight or twelve-inch walls under all bearing partitions. Build these supporting walls up to the top of the floor-beams, so as to permit the stud partitions above to rest directly on the brick-work, and thereby avoid the shrinkage of the beams. All stud partitions above the first story should, if possible, rest on the heads of the partitions beneath, thus again avoiding shrinkage and consequent settling.—3. It is false economy to use light floor-beams, as their constant vibration when walked upon is excessively annoying and unpleasant. They should never be placed more than 16 inches apart between centres, and for ordinary spans should be at least 2 by 10 inches, and 2 by 11 and 2 by 12 inches for spans not over 18 feet. All beams should be thoroughly cross-bridged, and all floors should be deafened. This deafening is not only for the purpose of deadening the sound, but it also prevents any water that may be spilled on the floor above staining the ceiling underneath. It also prevents the rapid spread of fire.—4. All ceilings should be cross-furred, the purpose of which is to bring the ceiling to a true level and to prevent cracking.—5. It is a very good plan to have all doors hung on loose-jointed butts, so as to allow of their being easily lifted off the hinges, should they require at any time to be eased or planed off. This is also a

great convenience on occasion of an entertainment, as the doors can be removed and stored away, and the house thoroughly thrown open to the company.—6. All first-class houses should have double floors. The first flooring may be of mill-worked boards, and the finishing floor (which may be of any wood desired) should not be put down until the plastering is complete, and the base and casings to the door are up; by adopting this plan a very thorough floor is obtained, as we avoid all the dirty and wet work of the plasterer, and the wear and tear incident to the passing to and fro of the workmen. The effect of the shrinkage of the base from the floor is also avoided, giving the work a better finish. It makes a much more rigid floor, and ties the building together much better, to lay the second floor at right angles with the first floor.—7. Always see that the plastering is carried down to the floor, and by this means avoid as far as possible having any space at the back of the base-board, wherein cockroaches and other vermin may find refuge. Also plaster behind panel-backs, under windows, and where the sub-sill rests on the stone sill, to prevent the cold air and snow from drifting in.—8. In wooden houses, be careful to have all of the cappings and tops to the windows and doors covered with tin, the tin to be carried up underneath the outside covering or clap-boarding.—9. In conclusion, put yourself at the outset in the hands of a good, thorough architect, and be governed by him in the mode of construction. Listen to his suggestions, for he has had much more experience than you. Do not desert him because he tells you candidly what your building will cost, and go to others who seek to persuade you that they can produce the same amount of room at much less cost; for this can only be done by the process of *skinning*, which means leaving out those matters which are contained in the above suggestions, and very many more, all of which greatly contribute to the durability of the house and the actual comfort of existence within it. In this, as in many other cases, the best economy does not lie in the fancied saving of money at the outset, but in the adoption of wise plans.

BRICK-MAKING, Application of the Ash and Small Coke of Gas Works for.—Mix from 10 to 12 parts of the ash and cinders with 1 part of lime, after having first taken care to break up the small pieces of coke, so as to be of no more than about 5 centimetres cubical size. The mass is mixed with some water, and next mixed in a

peg-mill, and, after having become stiff enough, formed into bricks by a brick-making machine. The bricks are slowly but carefully dried, and are, after drying, fit for use, making very solid walls, while the material is very light, and especially suited for partition walls.

BRICK, To Wet.—Very few people, even builders, are aware of the advantage of wetting bricks before laying them, or, if aware of it, too often neglect to practice it. A wall 12 inches thick, built of good mortar and bricks well soaked, is stronger than one 16 inches thick built dry. The reason of this is, that if the bricks are well saturated with water, they will not abstract from the mortar the moisture necessary to its crystallization; and, on the contrary, they will unite chemically, and become as solid as a rock. On the other hand, if the bricks are put up dry, they immediately take up all the moisture from the mortar, leaving it to dry and harden, and the consequence is that, when a building of this description is taken down, or tumbles down of its own accord, the mortar from it is like so much sand.

BRICK WALLS, Coating for.—1. Take of fresh Rosendale cement 3 parts, and of clean, fine sand 1 part; mix with fresh water thoroughly. This gives a gray or granite color, dark or light, according to the color of the cement. If brick color is desired, add enough Venetian red to the mixture to produce the color. If a very light color is desired, lime may be used with the cement and sand. Care must be taken to have all of the ingredients well mixed together. In applying the wash, the wall must be wet with clean, fresh water, then follow immediately with the cement wash. This prevents the bricks from absorbing the water from the wash too rapidly, and gives time for the cement to set. The wash must be well stirred during the application—the admixture to be made as thick as can be applied conveniently with a white-wash brush. It is stated that this cement wash will stand for years, that it is admirably suited for brick work, fences, etc., that it is nearly water-proof, but that it cannot be used to advantage over paint or whitewash.—2. Sylvester's process for repelling moisture from external walls, is easy of application and very effectual. It consists in using two washes or solutions for covering the surface of brick walls—one composed of castile soap and water, and one of alum and water. The proportions are: $\frac{3}{4}$ of a lb. of soap to 1 gallon of water, and $\frac{1}{2}$ a lb. of alum to 4 gallons of water, both substances to be perfectly dissolved in the water before being used. The walls should be perfectly clean and dry, and the temperature of the air should not be below 50° Fahrenheit, when the compositions are to be applied.

The first or soap-wash should be laid on when at boiling heat, with a flat brush, taking care not to form a froth on the brick work. This wash should remain 24 hours, so as to become dry and hard before the second or alum wash is applied, which should be applied in the same manner as the first. Four coatings will render the bricks impenetrable under a very heavy pressure.

BRICK OVENS, How to Make.—A brick oven built in the old style, out of doors, entirely separated from the dwelling-house, is more desirable and more safe, so far as danger from fire was concerned, than if built by the side of the

fireplace, in the house. A good brick oven for baking bread, pies, and cakes is worth all the ranges and cook-stoves that one could store in his kitchen. In such an oven every thing will be baked just right, above and below, through and through. After a foundation has been prepared, let two courses of hard bricks be laid for the bottom of the oven. Then build the mouth and part of the sides, until it is desirable to begin to draw the sides inward, when sand or mellow earth may be placed on the foundation, and the surface smoothed off and pressed down to the desired form of the oven. Now let the brick work be built over this form of sand. Let two courses of hard bricks be laid over the form with the best mortar. After the last bricks have been laid the sand may be removed. The bricks should be soaked for several hours previous to being laid, so that they will not absorb the moisture of the mortar until it has set. Such an oven will cost but a few dollars. Many people can collect a sufficient number of loose bricks and pieces around their dwellings to build a brick oven. Besides this, any intelligent man, though only half a mechanic, can build such an oven about as well as a mason.

BRICK BUILDINGS, How to Paint.—To prevent the disintegration of exterior brick surfaces, caused by moisture of the atmosphere and change of temperature, paint should be used to cover the surface; and it must be borne in mind that paints are durable mainly because of the water-proof quality of the oil in which they are used. The natural pigments—called ochres or earth-paints—do not in any degree act upon the oil; while others, as white leads and the chromates of lead, do affect the oil chemically, and impair in a measure its tenacity or water-proof quality; for these reasons it follows that the natural pigments are not only the most economical, but the most durable, for painting brick houses. It has been demonstrated that the most durable paint for brick painting is a mixture of finely-ground French yellow ochre, mixed with an equal quantity, by weight, of American white zinc. The color is a soft shade of buff, most pleasant to the eye, and permanent to the last degree, both in color and material. Venetian red, an artificial ochre, or red oxide of iron, is in common use; but it does not hold oil like the yellow ochre, and makes a coating far less water-proof. It is a seemingly durable paint, because the stain which it imparts to a porous surface remains long after the oil has been washed away. It cannot be used with white zinc, because of the unsuitable pink tint which it produces, and because this pigment, (Venetian red,) when tinted with white, becomes highly fugitive in color.

The condition of the wall is also very important in painting brick surfaces. The work should be done in dry, warm weather, when the moisture which bricks absorb during the winter and spring seasons has dried out; otherwise the paint will not be apt to adhere tenaciously, but will scale or peel off. The joints in the stone coping on brick walls require constant looking after. These should be made absolutely impervious to water by the application of a mass of soft paint-skins both on the top and edges; and when this hardens to the point of cracking, it should be removed and renewed. Mortar and cement for such purposes are altogether useless. The joint, too, between the wall and the coping

underneath should be well filled with paint-skins before painting; for, no matter how water-proof the surface may be, if the water be allowed to percolate through the joints in the coping, the integrity of the wall will be destroyed.

CELLARS, To Keep from Freezing.—A novel plan for this purpose is to take either old newspapers or coarse brown paper, and with a strong size paste them four or five thicknesses down thoroughly to the stone walls of the cellar and to the bare joists overhead, leaving an air space between them and the floor. Before pasting, it will be better to sweep down the walls and joists thoroughly. It will not be necessary to press the paper down into all the depressions of the wall; every air space is an additional defence against the cold. If this plan is adopted and carefully executed the cellar will be frost-proof, even if it is left unbanked.

CHIMNEYS, To Build.—Every chimney ought, if practicable, to extend clear to the bottom of the cellar, and rest there on a substantial foundation, covered with a broad, flat stone, to prevent the absorption of dampness by the bricks. This will not only prevent accidents from fire, but will prevent the superincumbent weight from injuring the wall in any way. More than this, when a chimney rests on a foundation in the attic, or even in an upper room, during long and severe storms such a large volume of water usually falls directly into the chimney that the bricks at the bottom become thoroughly saturated. Consequently, the surplus water soaks down through the wall below; whereas, if the chimney had extended to the bottom of the cellar, the walls would not have been injured by the great fall of rain.

By building chimneys with double walls, leaving an air space between them, an excellent means of ventilation is secured, from the top or bottom of rooms, as desired, by inserting ventilators in the outer chimney. The heat from the inner, when fires are used, will always make a good draft upward.

To build a chimney so that it will not smoke, the chief point is to make the throat of the chimney not less than 4 inches broad and 12 long; then the chimney should be abruptly enlarged to double the size, and so continue for 1 foot or more; then it may be gradually tapered off as desired. But the inside of the chimney, throughout its whole length to the top, should be plastered very smooth with good mortar, which will harden with age. If salt is mixed pretty freely with the mortar used, moisture enough will be imbibed to prevent the soot from adhering. The area of a chimney should be at least half a square foot, and no flue less than 60 square inches. The best shape for a chimney is circular or many-sided, as giving less friction, (brick is the best material, as it is a non-conductor,) and the higher above the roof the better.

CHIMNEYS, Remedy for Smoking.—From experience it has been found that by the use of fine wire gauze of from 36 to 40 wires to the inch, as a screen blower, or guard, judiciously applied to registers, stoves, ranges, or stove doors, little if any smoke will come into the room. The atmospheric pressure prevents the smoke entering the room through the gauze, and if applied immediately to the fire more smoke

will be consumed than by any other means. In that case the wire should be kept two inches from immediate contact with the hot fire.

COVERING BUILDINGS, Paw's Composition for.—Take the hardest and purest limestone, (white marble is to be preferred,) free from sand, clay, or other matter; calcine it in a reverberatory furnace, pulverize and pass it through a sieve. One part, by weight, is to be mixed with two parts of clay well baked and similarly pulverized, conducting the whole operation with great care. This forms the first powder. The second is to be made of one part of calcined and pulverized gypsum, to which is added two parts of clay, baked and pulverized. These two powders are to be combined, and intimately incorporated, so as to form a perfect mixture. When it is to be used, mix it with about a fourth part of its weight of water, added gradually, stirring the mass well the whole time, until it forms a thick paste, in which state it is to be spread like mortar upon the desired surface. It becomes in time as hard as stone, allows no moisture to penetrate, and is not cracked by heat. When well prepared it will last any length of time. When in its plastic or soft state it may be colored of any desired tint.

DARK ROOMS, To Lighten.—If the glass in the window of a room—the darkness in which is caused by its being situated in a narrow street or lane—is placed within the outer face of the wall, as is the custom in building houses, it will admit but very little light, what it gets being only the reflection from the walls of the opposite houses. If, however, for the window be substituted another in which all the panes of glass are roughly ground on the outside, and flush with the outer wall, the light from the whole of the visible sky, and from the remotest parts of the opposite wall, will be introduced into the apartment, reflected from the innumerable facets or facets which the rough grinding of the glass has produced. The whole window will appear as if the sky were beyond it, and from every point of this luminous surface light will radiate into all parts of the room.

DOOR-STEPS, of Concrete.—Make square boxes at the door where the steps are wanted. Then mix up coarse gravel or cement and make a mortar or concrete, mixing in cobble-stones, and fill the boxes or moulds. After a time remove the moulds, and place boards on the steps for people to walk over till the concrete has thoroughly hardened. If rightly made, these cement steps will remain hard and perfect, and neither the frost nor weather will injure them. They should be made in the spring of the year, so that they can have the summer and fall to harden in.

FLOORS, Oiled.—Oiling improves a floor in several ways. Grease-spots, of course, will not affect the wood thus treated; and much less scrubbing than is necessary for a plain floor will suffice to keep it clean. Moreover, the appearance is improved by the oil. Many of our native woods, prepared in this manner, become positively handsome. Finally, it gives the surface a harder texture, which makes it wear longer and more uniformly.

Paint costs more, takes longer to dry, and wears off more easily, since it simply forms a crust or coating upon the surface; while oil penetrates the wood. Hence an oiled floor looks

better than a painted one, especially if a little color, such as Van Dyke brown, umber, or burned sienna is added to the oil.

To prepare a floor in this manner, take raw linseed oil, or some cheap oil, not offensive in odor, and capable of drying; mix it, if desired, with some such transparent color as those mentioned above; and apply it with a common paint-brush. Lay it on smoothly, so that it will strike in uniformly over the whole surface, and not stand in spots. This may be done at night, after the day's work; and the place will be ready for use again the next morning. As far as the solid surface is concerned, it might be stepped upon at once without injury; but there would be danger in that case of tracking the grease to other parts of the house. A new coat of oil, applied in this way once or twice a year, is sufficient to keep a floor in perfect order.

FLOORS, Soluble Glass for.—Instead of the old-fashioned method of using wax for polishing floors, soluble glass is now employed to great advantage. For this purpose the floor is first well cleaned, and then the cracks filled up with a cement of water-glass and a powdered chalk or gypsum; afterward a water-glass of 60 to 65°, of the thickness of syrup, is applied by means of a stiff brush. Any desired color is to be imparted to the floor in a second coat of the water-glass, and additional coats are to be given until the requisite polish is obtained. A still higher finish may be given by pumicing off the last layer, and then putting on a coating of oil.

FLOORS, Cellar.—When it is inexpedient to go to the expense of cement, an excellent substitute is secured by taking coal-ashes and mixing it with water to the ordinary thickness of mortar. It does not matter how many lumps or stones there are. Put it on about 4 inches thick; let it lay 24 hours, and then stamp it with a heavy block of wood 3 or 4 times a day until it is perfectly hard. It will be found to be as good, if not better, than cement, and will not crack or scale off.

FLOORS, for Basements.—In the preparation for laying the floor, the ground underneath is dug out, so as to leave what is termed an "air space" between it and the joists. The airing of the under side of the floor is procured at the expense of the comfort of the upper surface, and consequently of that of the house itself; for the inch flooring is but slight defence against the cold, which must necessarily find its way beneath. A far better mode of flooring basements, outages, dairies, etc., is to spread on the ground a bed of air-slacked lime, on which the joists should rest and be sunk, say an inch or two deep, so as to leave no chance for air to enter, and at the same time effectually keep out all vermin, as they will not attempt to burrow in lime. At first sight this seems to be an expensive mode of wearing comfort, but it is quite the contrary. Ten bushels of lime is ample for a square of 10 feet, (100 square feet,) and there are very few localities in which lime is not cheap and plenty. Such an underlaying of lime will prove a most desirable preservative of basement floors, and render a dwelling sanitary, warm and sound.

GRAVEL CONCRETE, for Houses.—This is the best building material in the world. Where gravel is abundant, it is 4 times cheaper than wood, 6 times cheaper than stone, and immensely superior to either. Proportions for

mixing: To 8 barrows of slacked lime well deluged with water, add 15 barrows of sand, (do not use river or beach sand, as I have observed this will absorb damp;) mix these to a creamy consistency, and then add 60 barrows of coarse gravel, which must be worked well and completely. You can throw stones into this mixture of any shape or size, to 9 or 10 inches in diameter. Form moulds for the walls of the house by fixing boards horizontally against upright standards, which must be immovably braced, so that they will not yield to the immense pressure of the material as it settles; set the standards in pairs around the building where the walls are to stand, from 6 to 8 feet apart, and so wide that the inner space shall form the thickness of the wall. Into the moulds thus formed throw the concrete material as fast as you choose, and the more promiscuous the better. In a short time the material will get as hard as the solid rock. If the gravel is free of dirt, the sand also clean, and the weather dry, the walls can be raised one foot each day, if you have help to do that amount of labor.

Some prefer to make the gravel and sand into mortar and press it into bricks, and then lay into walls; but the wall must be stronger if laid up solid in board frames made to raise up as required.

Many persons argue for the eight-square or octagon house; but I like the square form much the best, carrying up the hall and main partition walls of the same material. The eight-square house looks like an old fort or water-tank, and is very expensive to finish, costing much more than the same room with square angles; for mechanics cannot put up cornices, outside or inside, in less than double the time required for making the common square mitre.

HOUSES, When to Paint.—Repeated experiments prove that paint applied between November and March will last twice as long as that applied in warm weather. The reason is that in cold weather the component parts of the paint form a hard substance on the surface, as hard almost as glass. But in warm weather the oil penetrates the boards, and the paint soon wears off.

HOUSES, Choice of Color for.—The choice of color for country houses requires the exercise of taste, judgment, and an eye for harmonious combinations. It is laid down as a rule by Calvert Vaux, that every building requires four tints to make it a pleasant object in the way of color. "The main walls," he remarks, "should be of some agreeable shade of color, the roof-trimmings, verandas, and other wood-work, being either of a different color, or of a different shade of the same color, so that a contrast, but not a sharp one, may be established—a third and fourth color, not widely different from the other wood-work, should be applied to the windows, blinds, etc."

The greatest defect in the generality of country buildings is the too frequent use of white. Another most decidedly objectionable color is unmodified red, or those brown-stone tints, approaching to chocolate color, which are so frequently used in the construction of town dwellings.

The simplest practical rule in the painting of houses, is to choose paint of some neutral tint that is quiet and satisfactory, and let the facings

of the windows, cornices, etc., be painted several shades darker of the same color.

LIGHTNING RODS, How to Erect.—1. The rod should consist of round iron of about 1 inch in diameter; its parts, throughout its whole length, should be in perfect metallic continuity, by being secured together by coupling ferrules.—2. To secure it from rust the rod should be coated with black paint, itself a good conductor.—3. It should terminate in a single platinum point.—4. The shorter and more direct the course of the rod to the earth the better; bendings should be rounded, and not formed in acute angles.—5. It should be fastened to the building by iron eyes, and may be insulated from these by cylinders of glass, (I do not, however, consider the latter of much importance.)—6. The rod should be connected with the earth in the most perfect manner possible, and nothing is better for this purpose than to place it in metallic contact with the gas pipes, or, better, the water pipes, of the city. This connection may be made by a ribbon of copper or iron soldered to the end of the rod at one of its extremities, and wrapped around the pipe at the other. If a connection of this kind is impracticable, the rod should be continued horizontally to the nearest well, and then turned vertically downward until the end enters the water as deep as its lowest level. The horizontal part of the rod may be buried in a stratum of powdered charcoal and ashes. The rod should be placed, in preference, on the west side of the building. A rod of this kind may be put up by an ordinary blacksmith. The rod in question is in accordance with our latest knowledge of all the facts of electricity. Attempted improvements on it are worthless, and, as a general thing, are proposed by those who are but slightly acquainted with the subject.

LIME, to Burn, Without a Kiln.—Make a pyramidal heap of large lime stones, with arched furnace next the ground for putting in the fuel, leaving a narrow vent or funnel at the top; now cover over the whole pile with earth and turf, in the way that charcoal heaps are covered, and put in the fire. The heat will be more completely diffused through the pile if the aperture in the top is partially closed. This produces a superior article of lime.

MORTAR.—Much of the mortar used in building is said to be imperfectly made. Four parts coarse and three parts fine sand, with one part of quick-lime, well mixed with but little water, makes mortar which soon becomes as hard as adamant; resisting all atmospheric action as durably as the material it unites; and with the addition of a portion of manganese, it will harden under water.

MORTAR, HYDRAULIC.—An easy way of making hydraulic mortar out of ordinary lime consists in adding to burned lime as much water as it will take up without becoming pasty, and allowing it to stand in heaps for 8 days, and swell up. It is then passed through a wire sieve with meshes about the fifteenth of an inch in diameter, for the purpose of separating the hard particles. The residuum of preceding siftings, that have been exposed to water or moist air, are to be rubbed up and added to the mass, the whole to be well mixed together and then piled up in heaps, protected from rain, till needed. It may be preserved thus for years, ready for use at any moment.

PARTITIONS.—There is nothing so concerns the actual strength of a house, internally, as those division walls which are called "partitions." They relieve the external walls of much of their burden, and, more than that, they act as braces or binders for the whole skeleton of the house. Even the roof is dependent in a very great degree on these partitions, as it is owing to their presence and strength that the general construction of a dwelling is more or less strong.

In view of permanency, partitions should always be well braced, and the braces so disposed as to throw the superincumbent weight naturally toward the walls. This office of the brace is one on which its utility chiefly depends. Economy is a reason for the employment of the brace in parts of Europe, and in all countries where labor is scarce and dear; for it affords a chance to use up stuff that might otherwise be wasted. Partitions, after being put up, should be suffered to remain exposed for a sufficient time to the action of the atmosphere to give a chance for shrinkage before lathing and plastering on them. The shrinkage of the joists on each floor, though but one-eighth of an inch, is considerably increased in the partition up through the house, where the joists lie on the partition-heads; for one-eighth of an inch on the ground floor makes a quarter of an inch on the next floor, and so on in the same multiplying ratio; for this reason some builders have considered it more advisable that partitions should have no sills, but the studs be carried down between the joists, and framed into the head of the partition immediately below. Although this is correct in theory, nevertheless the sill is advantageous as making the partition much stronger. This, with bridging, is apt to make strong partitions. Where a partition is to be framed so as to have a door leading from the stairs into the drawing-room, and also with folding or sliding doors between the front and back parlors, or other rooms, the head of the partition in this case should be well trussed with oak, having a straining beam in the middle, two queen posts, and two braces, with lead at the abutment joints; these pieces are then to be forced together with bench screws, and kept in their places by wedges passing through the auxiliary heads.

Some authorities think that all plates and cross-ties of such partitions should be made to camber very considerably, the curve gradually increasing as the stories ascend; and all the floors, ceilings and door-heads should conform to this camber, which should not be less than half an inch on the first floor, and an inch on the second floor, and an inch and a half on the third floor, and so on in proportion. If this precaution be not taken, in less than two years (think those authorities) the floors and ceilings must fall out of level at their centres, as much both from the shrinkage of the timber as from the strain upon it from burden. The door-jambs fixed in such partitions invariably strain out of square at their angles, more or less, in proportion to the dryness of the timber, the skill exercised in trussing the work, and the degree of burden cast on the partition. Therefore all such jambs should have their heads fixed somewhat out of level, so as to settle permanently to a correct square form, instead of being level, so as to settle permanently out of square. In general, plates immediately above the floors should be

omitted, as the more horizontal timber there is, the more shrinkage there will be, and consequently the more settlement; and as such plates mostly require to be cut through for doorways, they are rarely of use as ties to the work. Under each end of each truss a granite or any hard stone templet, 3 or 4 feet long, should be set; these should be strongest and longest where the trusses act with most energy.

It may be added to this, that in many houses, as at present built, the shakiness of all the floors is caused by the cellar having no partitions, although its ceiling supports all the partitions and staircases of the whole house. We have often corrected this entirely by placing cross-beams and props in the cellar under the beams supporting the partitions, and, as nearly as possible, exactly under the partitions and staircases themselves, and by wedging these props up till they had raised the beams one-half or one whole inch, and even more, if necessary. Floors which were so shaky before that they vibrated at every step, may sometimes be made solid and firm in this way. Of course, the effectiveness of the remedy depends a great deal on the manner in which the house was originally built.

PLASTERING, Walls and Ceilings.—Particular care should be used in selection as to the strength and length of the hair to be used in the plaster for ceilings, and also as to the substance of the laths, which should in all cases be double. The plaster should be laid on with the minimum of thickness, a point much neglected.

With regard to the quality of the sand, it cannot be too good. Sand is apt to make the plaster too "short" only when there has been too much employed, and that with weak chalk-lime. It is impossible that the admixture of loamy earth in any proportion can benefit any description of mortar or plaster, and therefore clean grit must be preferable to either pit or road sand, for loam in any shape is detrimental in proportion to its amount.

One word with regard to a possible substitute for hair, as hair is becoming every day more difficult to obtain. In the pulling down of portions of old work for the reparation of the Lollards' Tower at Lambeth lately, some plaster of remarkable hardness was found; it was far superior to any of the rest, and upon examination was discovered to have been mixed with chopped rye-straw (recognized by several of the heads which had been mixed up) instead of hair. This plaster was wonderfully sound and firm. Possibly other descriptions of straw might be found equally suitable for the purpose, and at any rate it would be quite worth while making some experiments on this subject.

Having obtained a really good plaster to work with, it is much to be wished that it might be applied in a somewhat more solid and durable manner than is usual, and that instead of flimsy laths nailed under the joists or on each side of partitions to receive it, short pieces of wood were fixed in between the joists or quarters, and the plaster trowelled on from front and back, so as completely to envelope these pieces of wood. By this means the plastering on partitions and ceilings would not be merely suspended coats, but integral portions of the structure, which, when dry, would become almost imperishable and incombustible. Thus, instead of being flimsy, ill-connected things, inviting fire to de-

stroy them, and the means of conducting that destroying element to all the other portions of the building, they would be, as it were, thin vertical or horizontal shields to prevent fire from spreading and touching the timbers.

PLASTER ORNAMENTS, Composition for.—Molds for casting plaster ornaments for ceilings may be made of a composition composed in the following proportion: Rosin, $\frac{3}{4}$ of a lb.; tallow, $\frac{1}{2}$ a lb.; beeswax, 6 oz. The object to be copied is first oiled, and this composition poured upon it until there is enough when cooled to make a strong mold. Or a mold can be made from plaster-of-Paris itself, by pouring it upon the object to be copied. If the latter be wood or metal it should be well oiled, but if it is also made of plaster-of-Paris it should be moistened with water, but no drops must stand on it. The plaster-of-Paris may be colored, while being mixed, with oxide of copper (dissolved) for blue; with ashes for pearl gray; with the various ochres for red, yellow and green. Red and yellow oxides of lead are used for red and yellow colors. Real mastic is made of say 14 parts, by measure, of clean, sharp sand; 14 parts, by measure, of pulverized limestone or marble dust; of litharge one-fourteenth in weight of the united weights of the sand and stone, and one-seventh of the whole weight of the three in linseed oil. The sand, marble dust, or limestone powder, are well dried before mixing. Then mixed into a mortar or plaster and applied to an oiled surface.

ROOFS, Composition for.—Take 1 measure of fine sand, 2 of sifted wood-ashes, and 3 of lime, ground up with oil. Mix thoroughly, and lay on with a painter's brush, first a thin coat and then a thick one. This composition is not only cheap, but it strongly resists fire.

ROOFING, A Cheap.—First cover the roof with ordinary tongued and grooved floor-boards, the same as you would lay a floor; then take roofing-paper, to be obtained in any large town or city, and cover the boards with that, to be laid on as shingles are laid, to lap over each sheet about an inch, and fastened down with large tacks. Over the paper spread raw tar. Raw tar is that which is not heated to render it thicker. It can be spread with a trowel made of a shingle, about the sixteenth of an inch deep. Next take a sieve, fill it with sand, and sprinkle as much over the tar as it will absorb, sifting on the sand as each course of tar is laid on, beginning on the upper side of the roof, about half an inch thick.

Such a roof should have a slight descent—say 1 foot in 12, more or less; and the tar should be laid on when the heat of the sun will not cause it to run out of its place before the sand is put on it.

A mortar made of tar and sand, like a thick paste, will stop any leaks in roofs, especially around chimneys, that can be covered by it.

ROOFS OF TIN.—For a flat roof, tin is, beyond question, the most economical covering that can be applied. If not neglected, it is absolutely indestructible by external influences, and will last a hundred years, in as good condition as when first laid on, if kept well painted. Tin on a house-top should be well painted once in 4 years.

For roofs, light, cool colors are preferable, because they reflect the warm rays of light, and

thereby lessen the expansion and contraction of the metal, and the shrinking of the boards underneath, and so lessen the liability of the tin to crack in the seams. The temperature of attic rooms in summer will be materially lower if the roof be painted with a light rather than with a dark color.

The writer has learned, from long experience, that the finest French ochre is the most economical pigment that can be used for that purpose. If, as is sometimes the case in country houses, where the roof is a conspicuous object in the architecture of the building, a dark color be indispensable, the use of pure Venetian red, darkened with lamp-black, is recommended as the most durable and economical. If, by some process, the oil used in roof-painting could be prevented from becoming hard and brittle, it would be a great gain.

The poorest oil-paint, however, is better than neglect; and the best economy consists in keeping tin entirely and thoroughly protected from the corroding influence of dampness. Old paint, which has become "fatty" from exposure to the atmosphere, is better than new for roof-painting. Not a drop of turpentine should be used for such work.

ROOFS OF THATCH, How to Make.—Rye or wheat straw only should be used, and must be carefully threshed with a flail to leave the straws unbroken. Bind in bundles, distributing the butts of the straws equally to each end of the bundle. A good roof cannot be made if the straws all lie one way. It was always customary to make the band three feet long, as this gave a bundle of convenient size for handling. In a dry time we sat the bundles on end and threw water upon them a day or two before we used them.

The rafters are placed in the usual way, and crossed by slats two by two, nailed 14 inches apart, though 12 inches will do equally well.

Begin at the eaves and lay a row of bundles across. Have an iron needle 18 inches long prepared and threaded with oakum 8 feet long. Fasten the thread to the slat and pass the needle through the bundle to a boy stationed under the rafters, making 3 to 4 stitches to the bundle. The boy draws the cord up tight, and passes the needle up through again, but on the other side of the slat. By this means the first course is sewed on. Succeeding courses are treated in the same way, being laid so as to overlap the stitching. Lay the heaviest row of straw at the eaves to make it look well. When you come to the ridge, fold the tops of the straw over until you bring up the other side, then get some thin sods, 10 by 14 inches, and 1½ inches thick, and lay them neatly upon the top, using a small piece of board to clap them all slick and smooth. Boards put on like ordinary ridge boards will do instead of sods, if preferred.

Get the point of an old scythe, about 18 inches long; attach a handle, so that it will be like a long knife, and with it "switch down" the roof all over, to carry off all the loose straws, and trim the others off smooth. If well done, the roof will be as smooth as a board. Stretch a cord along the eaves the whole length of the building, and trim off straight by it, leaving the outside a little lower than the inside, which will prevent its looking thick and heavy.

A roof made in this way will not be injured

by wind or rain, and it will last from 25 to 30 years.

SCREWS in Soft Wood.—Screws, when subject to strain, are apt to work loose in soft wood, and the screw-hole should be first filled with thick glue. If no glue is handy, put powdered rosin around the hole, and heat the screw before driving.

SHINGLES, To Prevent Decay of.—The following is said to effectually prevent the decay of shingles: Take a potash kettle, or large tub, and put into it 1 barrel of lye of wood ashes, 5 lbs. of white vitriol, 5 lbs. of alum, and as much salt as will dissolve in the mixture. Make the liquor quite warm, and put as many shingles in it as can be conveniently wet at once. Stir them up with a fork, and, when well soaked, take them out and put in more, renewing the liquor as necessary. Then lay the shingles in the usual manner. After they are laid, take the liquor that was left, put lime enough into it to make whitewash, and, if any coloring is desirable, add ochre, Spanish brown, lamp-black, etc., and apply to the roof with a brush or an old broom. This wash may be renewed from time to time. Salt and lye are excellent preservatives of wood. It is well known that leach tubs, troughs, and other articles used in the manufacture of potash, never rot. They become saturated with the alkali, turn yellowish inside, and remain impervious to the weather.

SHINGLES, Fire-proof Wash for.—A wash composed of lime, salt, and fine sand or wood ashes, put on in the ordinary way of whitewashing, renders the roof 50 per cent. more secure against taking fire from falling cinders, in case of fire in the vicinity. It pays the expense a hundred fold in its preserving influence against the effects of the weather. The older and more weather-beaten the shingles, the more benefit derived. Such shingles generally become more or less warped, rough and cracked; the application of the wash, by wetting the upper surface, restores them at once to their original or first form, thereby closing up the space between the shingles, and the lime and sand, by filling up the cracks and pores in the shingle itself, prevents its warping.

STONE, Artificial.—The new process, according to the method of Sorel, of making artificial stone, consists in mixing magnesia cement with suitable material; with sand it gives brick; with flint, whet-stones and oil-stones; with kaolin, ornaments of all kinds, statuettes, etc.; with sawdust it gives a good material for covering floors; with carbonate of lime imitations of marble.

The cement is applied in a liquid form, and the mass sets in a few hours. The magnesia must be carefully calcined and the materials well mixed.

STONE, Preserving the Surface of.—The use of oil for this purpose is not only difficult of application, but, perishable as it is, it would quickly change its nature, oxidize, and thicken, until it attracted the floating impurities in the atmosphere, and would only conceal the hastening work of decay. A new method, devised by Mr. F. Ransome, affords a rapid and effectual means of successfully preserving the stone, hitherto a thing never accomplished. It consists in the successive application of three solutions—the first containing soluble phosphate of lime; the

second, baryta; and the third, a solution of silicate of potash, rendered neutral by the late Professor Graham's well-known process of dialysis. These solutions successively applied combine, and form an insoluble and imperishable mineral compound, which effectually resists the action of the atmosphere, and, by indurating the stone, at once arrests its disintegration. The extensive experience which has been gained by the adoption of this method places it far beyond the region of experiment, and justifies its recommendation under nearly all circumstances.

TOOLS, To Preserve from Rust.—A coating of 3 parts lard and 1 part resin, applied to tools of iron or steel, will effectually prevent rust.

TOOLS, Art of Grinding.—More than one-half of all the wear and tear, and breakage and bother of dull tools comes from a lack of proper knowledge and practice in grinding. All steel, however refined, is composed of individual fibres laid lengthways in the bar, held firmly together by cohesion; and in almost all farm implements of the cutting kind the steel portion which forms the edge, if from a section of a bar, is laid in welded to the bar longitudinally, so that it is the side of the bundle of fibres hammered and ground down that forms the edge. Hence, by holding on the grindstone all edge-tools, as axes, drawing-knives, knives of reapers, scythes, knives of straw-cutters, etc., in such a manner that the action of the stone is at right angles with the plane of the edge, or, in plainer words, by holding the edge of the tools square across the stone, the direction of the fibres will be changed, so as to present the ends instead of the side as a cutting edge. By grinding in this manner a finer, smoother edge is set, the tool is ground in less time, holds an edge a great deal longer, and is far less liable to nick out and to break.

Plane irons should be ground to a bevel of about 35 degrees—chisels and gouges to 30. Turning-chisels may sometimes run to an angle of 45. Molding tools, such as are used for ivory and for very hard wood, are made at from 50 to 60 degrees. Tools for working iron and steel are leveled at an inclination to the edge of from 60 to 70 degrees, and for cutting gun and similar metal range from 80 to 90.

WINDOW SASHES, to Prevent Rattling.—The unwelcome music of rattling windows will often arouse and electrify nervous and timorous persons quite as effectually as if a band of burglars were making an entrance into the dwelling.

The remedy is by no means difficult or expensive. Let the sashes be taken out of the window frames, and every part of the window examined. If the jamb-casings have been sprung, or are warped and twisted, the first step will be to remove the stops and straighten the face of the casings, which may be done more conveniently with a large rabbit plane and a smoothing plane.

In case the sashes should be much too narrow for the frame, let one edge be dressed off true, and a thin strip fitted neatly and glued and nailed to the edge of one stile. See that the outside edge of such stile is not tapering, even by the thickness of a heavy shaving. When the stiles are tapering only a trifle, the sashes cannot be moved up and down easily. Now put the upper sash in its place, and fasten the central stop with

two or three long, slender wood-screws, after which remove the outside stops, and place them so closely to the stiles of the sash that the window will not rattle. Then let the stops be secured on the inside so closely to the stiles of the sash that it will move up and down easily, without having so much play that the wind will rattle it. When the sashes have been fitted as directed, there will be no more need of "weather strips" of any kind to exclude dust and cold air, and the expense of refitting a window as directed will be much less than the cost of weather strips.

WOOD, to Prevent Decay in.—To prevent the common occurrence of decay in wood, take 20 parts of resin, 46 parts of finely-powdered chalk, some hard sand, a little linseed oil and sulphuric acid; mix all together, and boil for a short time. This composition, if applied while hot, forms a kind of varnish, thereby preserving the wood.

WOOD, Samuel's Method of Preserving.—The wood to be operated upon is first placed in an air-tight cylinder and thoroughly steamed, in order to vaporize the sap in the wood; the air is then withdrawn from the cylinder, by means of an air pump, until a perfect vacuum, or nearly so, is created, which opens and frees the pores in the wood, when a solution of sulphate of iron is forced into the cylinder, under a pressure of 175 lbs. to the inch, which forces the solution through the pores. This pressure is kept up for half an hour, giving the solution time to percolate or permeate every portion of the wood, when a solution of carbonate of lime is forced into the cylinder, which has the effect to precipitate the iron, and in this manner forming a sulphate of lime, thus coating or filling all the minute cells of the wood with a mixture of oxide of iron and sulphate of lime. The wood is then thoroughly cleansed and dried, when it is found to have attained an extraordinary degree of toughness, and capable of receiving a beautiful polish, besides being rendered completely impervious to rot of any kind, and impenetrable to insects.

WOOD, Stone Coating for.—40 parts of chalk, 50 of resin, and 4 of linseed oil, melted together; to this should be added 1 part of oxide of copper, and afterward 1 part of sulphuric acid. This last ingredient must be added carefully. The mixture, while hot, is applied with a brush.

WOOD, to Render Incombustible.—Many conflagrations might be prevented, and much property saved, by rendering the wood work of houses secure against ignition. This can be done at an insignificant cost, and with little trouble. Perfect immunity is secured by saturating the wood-work with a very delicate solution of silicate of potash, as nearly neutral as possible, and when this has dried, applying one or two coats of a stronger solution. Another method is to simply impregnate the wood with a concentrated solution of rock salt. Water-glass will act as well, but it is expensive. The salt also renders the wood proof against dry rot and the ravages of insects. Another method is to immerse the wood in a saturated solution of borax, heat being gradually applied until the solution reaches 212° Fahrenheit, and is then left for 10 or 12 hours, according to the nature of the wood and size of the planks.

WOOD, to Prevent its Cracking.—Wooden

stop-cocks, and other objects of wood, are liable to crack. To prevent this lay them in a bath of fused paraffine heated to 212° Fahrenheit, and leave them as long as bubbles of air are given off. Then allow the paraffine to cool down to

its point of congelation, and remove the wood and wipe off the adhering wax. Objects treated in this way are not likely to crack. The process could be used advantageously for inlaid woods and fine furniture.

CEMENTS, GLUES AND PASTES.

CEMENTS.

APPLYING CEMENTS, Manner of—Quite as much depends upon the manner in which a cement is applied as upon the cement itself. The best cement that was ever compounded would prove entirely worthless if improperly applied. Good common glue will unite two pieces of wood so firmly that the fibres will part from each other rather than from the cementing material. Two pieces of glass can be so joined that they will part anywhere rather than on the line of union. Glass can be united to metal, or metal to metal, or stone to stone, and all so strongly that the joint will certainly not be the weakest part of the resulting mass. The rules to be observed to effect this are: 1. The cement itself is to be brought into intimate contact with the surface to be united. The obstacles to this junction are air and dirt. The former is universally present; the latter is due to accident or carelessness. Unless the adhering layer of air is displaced, the cement cannot adhere to the surface to which it is applied, simply because it cannot come in contact with it. The most efficient agent in displacing air is heat. Therefore, the two surfaces to be joined are to be thoroughly heated before the cement is applied. 2. Use as little cement as possible. When the surfaces are separated by a large mass of cement, we have to depend upon the strength of the cement itself, and not upon its adhesion to the surfaces which it is used to join; and, in general, cements are comparatively brittle.

ARMENIAN CEMENT.—The jewelers of Turkey, who are mostly Armenians, have a singular method of ornamenting watch-cases, etc., with diamonds and other precious stones, by gluing or cementing them on. The stone is set in silver or gold, and the lower part of the metal made flat, or to correspond with the part to which it is to be fixed; it is then gently warmed and the glue is applied, which is so very strong that the parts thus cemented never separate. This glue will strongly unite pieces of glass and china, and even polished steel, and may be applied to a variety of useful purposes. The following is the recipe:

Dissolve 5 or 6 bits of gum mastic, each the size of a large pea, in as much rectified spirits of wine as will suffice to render it liquid; and, in another vessel, dissolve as much isinglass, previously a little softened in water, (though of the water must be used,) in French or good rum, as will make a two-ounce very strong glue, adding two small bits of galbanum or ammoniacum, which must be bed or ground till they are dissolved.

Then mix the whole with a sufficient heat. Keep the glue in a vial closely stopped, and every time it is to be used set the vial in boiling water.

ALABASTER CEMENT.—1. Finely powdered plaster-of-Paris, made into a cream with water.—2. Melt yellow resin, or equal parts of yellow resin and beeswax; then stir in half as much finely powdered plaster-of-Paris. The first is used to join and fit together pieces of alabaster or marble, or to mend broken plaster figures. The second is used to join alabaster, marble, porphyry, and any similar substances that will bear being heated.

ARCHITECTURAL CEMENT.—1. Reduce paper to a smooth paste by boiling it in water; then add an equal weight each of sifted whiting and good size; boil to a proper consistence.—2. Paper paste and size, equal parts; finely powdered plaster-of-Paris to make it of a proper consistence. Use it as soon as mixed. Can be used in making architectural busts, statues, columns, etc. It is very light, receives a good polish, but will not stand the weather.

BRUYER'S WATER CEMENT.—Mix 3 gals. of clay with 1 gal. of slacked lime, and expose them to a full red heat for 3 hours.

BUILDING CEMENT.—This is made by exposing a mixture of clay or loam, broken pottery, flints, silicious sand, or broken bottle-glass, with wood-ashes, to a considerable heat in a furnace, until it becomes partially vitrified. It must then be ground to a fine powder, sifted, and mixed with one-third its weight of quicklime, also in fine powder, after which it must be packed (tight) in casks to preserve it from the air and moisture. For use it is mixed up with water and applied like Roman cement.

BOTANY BAY CEMENT.—Yellow gum and brick-dust equal parts, melted together. It is used to cement coarse earthenware, etc.

CEMENT FOR AQUARIA.—Many persons have attempted to make aquarium, but have failed on account of the extreme difficulty in making the tank resist the action of water for any length of time. The following is a recipe for a cement that can be relied upon; it is perfectly free from anything that can injure the animal or plants; it sticks to glass, metal, wood, stone, etc., and hardens under water. A hundred different experiments with cements have been tried, but there is nothing like it. It is the same as that used in constructing the tanks of the Zoological Gardens, London, and is almost unknown in this country: 1 part, by measure, (say a gill,) of litharge; 1 gill of plaster-of-Paris; 1 gill of dry, white sand; $\frac{1}{4}$ of a gill of finely-powdered rosin. Sift and keep corked

tight until required for use, when it is to be made into a putty by mixing in boiled oil (linseed) with a little patent dryer added. Never use it after it has been mixed (that is with the oil) over 15 hours. This cement can be used for marine as well as fresh water aquaria, as it resists the action of salt water. The tank can be used immediately, but it is best to give it 3 or 4 hours to dry.

CEMENT for Attaching Metal to Glass.—

Take 2 oz. of a solution of glue, and mix it with 1 oz. of linseed-oil varnish, and $\frac{1}{2}$ an oz. of pure turpentine; these articles are then boiled together in a close vessel. The two bodies should be clamped and held together for about 2 days after they are united, to allow the cement to become dry. The clamps may then be removed.

CEMENT for Attaching Brass Work to Lamps.

—A cement particularly adapted for attaching the brass work to petroleum lamps, is made by boiling 3 parts resin with 1 of caustic soda and 5 of water. This composition is then mixed with half its weight of plaster-of-Paris, and sets in from half to three-quarters of an hour. It is said to be of great adhesive power, not permeable to petroleum, a low conductor of heat, and but superficially attacked by hot water. Zinc white, white lead, or precipitated chalk may be substituted for plaster, but they harden more slowly.

CEMENT for Broken Marble.—Take gum arabic, 1 lb.; make into a thick mucilage; add to it powdered plaster-of-Paris, $1\frac{1}{2}$ lbs.; sifted quick-lime, 5 oz.; mix well; heat the marble and apply the mixture.

CEMENT for Brick Walls.—Cement for the outside of brick walls, to imitate stone, is made of clean sand, 90 parts; litharge, 5 parts; plaster-of-Paris, 5 parts, moistened with boiled linseed oil. The bricks should receive 2 or 3 coats of oil before the cement is applied.

CEMENT for China, Glass, Crockery, Metals and Wood.—1. An excellent cement for mending china may be made as follows: Take

the white of an egg and a little flour, which make into a light paste; clear the parts to be joined from all dust and dirt; spread some of the paste on each piece and press them together; while wet, wipe off the exuding portions, both inside and out; then let it remain until quite dry.

—2. The following recipe we know from experience to be a good one, and, being nearly colorless, it possesses advantages which liquid glue and other cements do not. Dissolve $\frac{1}{2}$ an oz. of gum acacia in a wine-glass of boiling water; add plaster-of-Paris sufficient to form a thick paste, and apply it with a brush to the parts required to be cemented together.

For Mending Broken China, Glass, etc.—3. Take 1 lb. white shellac, pulverized; 2 oz. clean gum mastic; put these into a bottle, and then add $\frac{1}{2}$ a lb. pure sulphuric ether. Let it stand $\frac{1}{2}$ an hour, and then add $\frac{1}{2}$ a gal. 90 per cent. alcohol. Shake occasionally till it is dissolved. Heat the edges of the article to be mended, and apply the cement with a pencil brush; hold the article together until the cement cools. This makes a transparent cement.

—4. **An Indian Cement for Glass and Metals.**—Dissolve 5 or 6 pieces of gum mastic, each about the size of a large pea, in just as much spirit as will render it liquid. Soften some isinglass by steeping it in water; having dried it, dissolve as much of it in good brandy as will fill a two-ounce phial; add 2

small bits of gum ammoniacum, previously rubbing them until they are dissolved. Mix the 2 solutions; keep in a close phial, and when it is to be used set the phial in boiling water.

—5. Take a thick mucilage of gum arabic and stir into it plaster-of-Paris—the broken images are best—made very fine, to form a thick paste, and apply to the edges with a brush, and press firmly together and confine there two or three days. I have pulled over 30 pounds with a wine-glass,

the stem of which had been broken and mended with the cement.

—6. Dissolve 1 oz. common salt in 1 quart of water; bring to a boil, and put in $1\frac{1}{4}$ lbs. gum shellac. When it shall be dissolved pour into cold water and work like wax. Make into small sticks. This will make crockery as good as new.

—7. Steep Russian isinglass 24 hours in white brandy; gently boil and stir the mixture until it is well compounded, and a drop of it, cooled, will become a very thick jelly; then strain it through a linen cloth, and cork it up closely. A gentle heat will dissolve it into a colorless fluid. Broken dishes, united with it, will break elsewhere, rather than separate in the old fracture. To apply it, rub the edges, place them together, and hold them 2 or 3 minutes.

—8. A durable cement is made by burning oyster shells, and pulverizing the lime from them very fine; then mixing it with white of egg to a thick paste, and applying it to the china or glass, and securing the pieces together until dry.

—9. Take 4 lbs. of white glue, $1\frac{1}{2}$ lbs. of dry white lead, $\frac{1}{2}$ a lb. of isinglass, 1 gal. of soft water, 1 quart of alcohol, and $\frac{1}{2}$ a pint of white varnish. Dissolve the glue and isinglass in the water by gentle heat, if preferred; stir in the lead, put the alcohol in the varnish, and mix the whole together.

—10. A cement that will mend marble, china, and ornamental ware, is made by taking water 1 gal., nice glue 3 lbs., white lead 4 oz., alcohol, 1 quart. Mix. Directions—If it is cold weather, warm the bottle until the cement is dissolved; then with the finger or a brush rub it on the broken parts, (both edges,) put together, and retain in their places until dry.

—11. A cement withstanding both heat and moisture is simply pure white lead or zinc white, ground in oil, and used very thick. It is excellent for mending broken crockeryware, but it takes a very long time to harden sufficiently. The best plan is to place the mended object in some store-room, and not to look after it for several weeks, or even months. After that time it will be found so firmly united that, if ever again broken, it will not part on the line of the former fracture.

CEMENT for Chemical Glasses.—Mix equal parts of flour, finely-powdered Venice glass, pulverized chalk, and a small quantity of brick-dust, finely ground; these ingredients, with a little scraped lint, are to be mixed and ground up with the whites of eggs; it must then be spread upon pieces of fine linen cloth, and applied to the crack of the glasses, and allowed to get thoroughly dry before the glasses are put to the fire.

CEMENT for Covering the Fronts of Houses.

—50 parts, by measure, of clean, dry sand; 50 of limestone (not burned) reduced to grains like sand or marble dust, and 10 parts of red lead, mixed with as much boiled linseed oil as will make it slightly moist. The bricks, to receive it, should be covered with 3 coats of boiled oil,

laid on with a brush, and suffered to dry before the mastic is put on. It is laid on with a trowel like plaster, but it is not so moist. It becomes hard as stone in a few months. Care must be exercised not to use too much oil.

CEMENT, Copper-smith's.—Bullock's blood thickened with finely-powdered quicklime. It is used to secure the edges and rivets of copper boilers, and to mend leaks from joints, etc. It must be used as soon as mixed, as it rapidly gets hard. It is extremely cheap and very durable, and is suited for many purposes where a strong cement is required. It is frequently called blood cement.

CEMENT for Cloth or Belting.—Take ale 1 pt.; best Russia isinglass 2 oz.; put them into a common glue kettle and boil until the isinglass is dissolved; then add 4 oz. of the best common glue, and dissolve it with the other; then slowly add $1\frac{1}{2}$ oz. of boiled linseed oil, stirring all the time while adding, and until well mixed. When cold it will resemble India-rubber. When you wish to use this, dissolve what you need in a suitable quantity of ale to have the consistence of thick glue. It is applicable for earthenware, china, glass, or leather; for harness; bands for machinery; cloth belts for cracker machines for bakers, etc. If for leather, shave off as if for sewing, apply the cement with a brush while hot, laying a weight to keep each joint firmly for 6 to 10 hours, or over night.

CEMENT for Cutlers.—1. A material for fastening knives or forks into their handles, when they have become loosened by use, is a much-needed article. The best cement for this purpose consists of 1 lb. of colophony, (purchasable at the druggists,) and 8 oz. of sulphur, which are to be melted together, and either kept in bars or reduced to powder. One part of the powder is to be mixed with half a part of iron filings, fine sand, or brick-dust, and the cavity of the handle is then to be filled with this mixture. The stem of the knife or fork is then to be heated and inserted into the cavity; and when cold it will be found fixed in its place with great tenacity.—2. Black resin 4 lbs.; beeswax 1 lb.; melt them, and add 1 lb. of finely-powdered and well-dried brick-dust.

CEMENT for Cisterns.—Take equal parts of red and white lead, and wash them into a paste with boiled linseed oil. It hardens slowly, but afterwards acquires a flinty hardness. To be applied it should be made thin, and the metal thoroughly smeared with it.

CEMENT for Engineers.—1. Mix ground white lead with as much powdered red lead as will make it of the consistency of putty.—2. Mix equal weights of red and white lead, with boiled linseed oil, to a proper consistence. This is employed by engineers and others to make metallic joints. A washer of hemp, yarn, or canvas, smeared with the cement, is placed in the joint, which is then "brought home" or screwed up tight. It dries as hard as a stone.

CEMENT for Fastening Chamois and other Leather to Iron and Steel.—Dr. Carl W. Heinsichen, of Dresden, gives the following recipe for the above purpose: "Spread over the metal a thin, hot solution of good glue; soak your leather with a warm solution of gall-nuts before placing on the metal. If fastened in this way it is impossible to separate the leather from the metal without tearing it.

CEMENT for Fastening to Metals.—Any fibrous material can be stuck to metal, whether iron or other metal, by an amalgam composed of glue dissolved in vinegar, hot, and one-third of its volume of white pitch pine, also hot.

CEMENT for Fastening Rubber to Wood and Metal.—As rubber plates and rings are now-a-days almost exclusively used for making connections between steam and other pipes and other apparatus, much annoyance is often experienced by the impossibility or imperfectness of an air-tight connection. This is obviated entirely by employing a cement which fastens alike well to the rubber and to the metal or wood. Such a cement is prepared by a solution of shellac in ammonia. This is best made by soaking pulverized gum shellac in 10 times its weight of strong ammonia, when a slimy mass is obtained, which in from 3 to 4 weeks will become liquid without the use of hot water. This softens the rubber, and becomes, after volatilization of the ammonia, hard and impermeable to gases and fluids.

CEMENT for Floors.—Take $\frac{2}{3}$ of lime and $\frac{1}{3}$ of coal-ashes well sifted with a small quantity of loam clay; mix the whole together, and temper it well with water, making it up into a heap; let it lie a week or 10 days, and then temper it over again. After this, heap it up for 3 or 4 days, and repeat the tempering very high, till it becomes smooth, yielding, tough and glossy. The ground being then levelled, lay the floor therewith about $2\frac{1}{2}$ or 3 inches thick, making it smooth with a trowel; the hotter the season is the better; and when it is thoroughly dried it will make the best floor for houses, especially for malt-houses. If any one would have their floors look better, let them take lime of rag-stones, well tempered with whites of eggs, covering the floor about $\frac{1}{2}$ an inch thick with it, before the under flooring is too dry. If this be well done, and thoroughly dried, it will look, when rubbed with a little oil, as transparent as metal or glass. In elegant houses, floors of this nature are made of stucco, or of plaster-of-Paris beaten and sifted, and mixed with other ingredients.

CEMENT for Gas-Fitters.—Mix together resin $4\frac{1}{2}$ parts; wax 1 part, and Venetian red 3 parts.

CEMENT for Gas Retorts.—A new cement, especially adapted to the retorts of gas works, is very warmly recommended in a German gaslight journal. It consists simply of finely powdered barytes and soluble water-glass; or the barytes and a solution of borax. The joints are to be coated several times with this cement by means of a brush. The addition of two-thirds of clay improves the cement, and the retorts will then stand a red heat very well. Instead of the water-glass a solution of borax may be used, or even finely powdered white glass.

CEMENT for Gutters and Leaky Places.—A good cement for gutters and leaky places may be made of boiled paint-skins, if while hot and thick, a portion of sand and fine lime be sifted in. It must be used while hot, and when dry will be as hard as iron, and as durable.

CEMENT for Iron.—Take 16 parts of steel filings, 3 parts sal ammoniac, and 2 parts flow-er of sulphur. This mixture can be preserved any length of time in dry packages. In order to lute with it, add to 1 part of the mixture 12

parts of iron filings, and enough water, previously acidulated with sulphuric acid, to form a paste. This is now ready to be applied to the perfectly clean surfaces of the metal to be luted. For iron castings and small holes, the pulverized iron (*ferrum pulveratum* of apothecaries) can be substituted for iron filings.—2. To 4 or 5 parts of clay, thoroughly dried and pulverized, add 2 parts of iron filings free from oxide, 1 part of peroxide of manganese, $\frac{1}{2}$ of sea salt, and $\frac{1}{2}$ of borax. Mingle thoroughly, and render as fine as possible; then reduce to a thick paste with the necessary quantity of water, mixing thoroughly well. It must be used immediately. After application it should be exposed to warmth, gradually increasing to almost a white heat.

This cement is very hard, and presents complete resistance alike to a red heat and boiling water.—3. 60 parts of pulverized cast-iron turnings are mixed with 2 parts sal ammoniac and 1 part flower of sulphur; and water is added till a paste is formed. A cement is thus obtained which spontaneously becomes hot, evolving sulphureted hydrogen, and becoming soon very hard. Of course it must be prepared immediately before.—4. Another cement is to mix equal parts of sifted peroxide of manganese and well pulverized zinc white; add a sufficient quantity of commercial soluble glass to form a thin paste. This mixture, when used immediately, forms a cement quite equal in hardness and resistance to that obtained in any other way.

CEMENT for Iron, Mother-of-Pearl, etc.—Dissolve 1 part of isinglass and 2 of white glue in 30 of water; strain and evaporate to 6 parts. Add one-thirtieth part of gum mastic, dissolved in $\frac{1}{2}$ a part of alcohol, and 1 part of white zinc. When required for use, warm and shake up.

CEMENT for Iron Boilers.—This cement is used to stop the cracks and leaks in iron boilers, stoves, etc. 1. Dried clay in powder, 6 lbs.; iron filings, 1 lb. Make a paste with boiled linseed oil.—2. Take 2 oz. of muriate of ammonia, 1 oz. of flower of sulphur, and 16 oz. of cast-iron filings or turnings; mix them well in a mortar, and keep the powder dry. When the cement is wanted, take 1 part of this and 20 parts of clean iron filings or borings, grind them together in a mortar, mix them with water to a proper consistence, and apply them between the joints.

CEMENT for Leather.—To 10 parts bisulphide carbon and 1 part spirits turpentine add enough gutta-percha to make a tough, thickly-flowing liquid. The surfaces to be joined must be perfectly free from grease, which is accomplished by laying a cloth upon them and applying a hot iron for a time. The coat is applied to both surfaces, and pressure made till the joints are dry.

CEMENT for Leather Belting.—Take of common glue and American isinglass, equal parts; place them in a boiler and add water sufficient to just cover the whole. Let it soak 10 hours, then bring the whole to a boiling heat, and add pure tannin until the whole becomes sugary or appears like the white of eggs. Apply it warm. Half the grain off the leather where it is to be cemented; rub the joint surfaces solidly together, let it dry a few hours, and it is ready for practical use; and, if properly put together, it will not need riveting, as the cement is nearly of the same nature as the leather itself.

CEMENT for Leather and Cloth.—An adhesive material for uniting the parts of boots and shoes, and for the seams of articles of clothing, may be made thus: Take 1 lb. of gutta-percha, 4 oz. of India rubber, 2 oz. of pitch, 1 oz. of shellac, 2 oz. of oil. The ingredients are to be melted together, and used hot.

CEMENT for Mahogany.—Melt 4 parts of beeswax or shellac with 1 of Indian red, adding as much yellow ochre as is requisite to give color. This cement will be found most suitable for stopping holes and rents in mahogany furniture.

CEMENT for Patent Fuel.—One of the best cements for the agglomeration of coal dust and the manufacture of patent fuel is that used in several European establishments, consisting of coal tar, gluten and starch. The quantities of these substances are altered according to the quality and property of coal dust; but they are very easily ascertained by a few experiments. About 2 per cent. of this mixture (say containing $2\frac{1}{2}$ parts of tar, 1 part gluten, and $\frac{1}{2}$ part of starch,) would be suitable for coal dust of an average quality of bituminous coal.

CEMENT for Preventing Leaks About Chimneys.—Dry sand, 1 part; ashes, 2 parts; clay, dried and pulverized, 3 parts. All to be pulverized and mixed into a paste with linseed oil. Apply it when soft, and when it becomes hard water will have no effect upon it.

CEMENT for Roofs of Houses.—Slake stone lime in a large tub or barrel with boiling water, covering the tub or barrel to keep in the steam. When thus slaked, pass 6 quarts through a fine sieve; it will then be in a state of fine flour. To this add 1 quart rock salt and 1 gal. water. Boil the mixture and skim it clean. To every 5 gals. of this carefully skimmed mixture, add $\frac{3}{4}$ of a pound of potash, and 4 quarts of fine sand or wood-ashes sifted. Both of the above will admit of any coloring you please. It looks better than paint, and is as durable as slate.

CEMENT for Rooms.—M. Sarel, of Paris, has made an invention which is pronounced better than plaster-of-Paris for coating the walls of rooms. It is used thus: A coat of oxide of zinc, mixed with size, made up like a wash, is first laid on the wall, ceiling, or wainscot, and over that a coat of chloride of zinc applied, prepared in the same way as the first wash. The oxide and chloride effect an immediate combination, and form a kind of cement, smooth and polished as glass, and possessing the advantages of oil paint without its disadvantages of smell.

CEMENT for Steam Pipes.—1. White lead, mixed, 2 parts; red lead, dry, 1 part; grind or otherwise mix them to a consistence of thin putty; apply interposed layers with one or two thicknesses of canvas or gauze wire, as the necessity of the case may be.—2. (Stephenson's.) If 2 parts litharge are mixed with 1 part dry-slaked lime and 1 part fine sand, well rubbed together, and mixed with such a quantity of hot linseed-oil varnish as to form a pasty mass, an excellent cement for iron steam-pipes is obtained, which soon sets hard. Consequently, it must be prepared fresh every time, and applied when still hot.

CEMENT for Stopping Cracks in Jars.—A good cement for stopping cracks in jars may be made as follows: Take equal quantities of

lead and white sand, and as much oil as will make it of the consistency of putty; in a few weeks it will become as hard as stone.

CEMENT for Stone.—Bottger informs us that a cement of extraordinary binding power is made by using infusorial silica in place of quartz sand. This infusorial earth is found in Germany only, but it has been imported into this country in considerable quantities. It consists of hydrated silica, which combines with bases much more readily than silica in the anhydrous condition, as in quartz sand. The infusorial silica is mixed in about equal proportions with oxide of lead; about $\frac{1}{2}$ a part of freshly slaked lime is then added, and the whole is then made into a paste with boiled linseed oil. The cement thus made quickly becomes as hard as sandstone, and will be found extremely useful in such work as fixing iron in stone for balusters and railings. It is not likely, we think, to expand in setting, and thus no risk of splitting the stone will be incurred. In this respect alone it offers a great advantage over Portland cement, sometimes used for the purpose we have mentioned, which, according to some authorities, does expand, and in consequence of which one very serious accident is supposed to have resulted.

CEMENT for Stoves.—1. Good wood-ashes are to be sifted through a fine sieve, to which is to be added the same quantity of clay, finely pulverized, together with a little salt. The mixture is to be moistened with water enough to make a paste, and the crack of the stove filled with it.—2. An excellent cement for iron stoves or furnaces is a paste of soluble glass and barytes, with or without some fine fire-clay, and the soluble glass may be replaced by a solution of borax, and both these and barytes by a mixture of clay and powdered glass.

CEMENT for Tile Roofs.—Equal parts of whitening and dry sand, and 25 per cent. of litharge, made into the consistency of putty with linseed oil. It is not liable to crack when cold, nor melt, like coal tar and asphalt, with the heat of the sun.

CEMENT, Cast-Iron.—Clean borings, or turnings, of cast iron, 16; sal ammoniac, 2 parts; flour of sulphur, 1 part; mix them well together in a mortar, and keep them dry. When required for use, take of the mixture, 1; clean borings, 20 parts; mix thoroughly, and add a sufficient quantity of water. A little grindstone dust added improves the cement.

CEMENT, Colored.—Professor Bottger prepares cement of diverse colors and great hardness by mixing various bases with soluble glass.

Soluble glass of 33° B. is to be thoroughly stirred and mixed with fine chalk, and the coloring matter well incorporated. In the course of 6 or 8 hours a hard cement will set, which is capable of a great variety of uses. Bottger recommends the following coloring matters:

1. Well sifted sulphide of antimony gives a black mass, which, after solidifying, can be polished with agate, and then possesses a fine metallic lustre.

2. Fine iron dust, which gives a gray-black cement.

3. Zinc dust. This makes a gray mass, exceedingly hard, which, on polishing, exhibits a brilliant metallic lustre of zinc, so that broken or defective zinc castings can be mended and re-

stored by a cement that might be called a cold zinc casting. It adheres firmly to metal, stone and wood.

4. Carbonate of copper gives a bright green cement.

5. Sesquioxide of chromium gives a dark green cement.

6. Thenard's blue, a blue cement.

7. Litharge, a yellow.

8. Cinnabar, a bright red.

9. Carmine, a violet red.

The soluble glass, with fine chalk alone, gives a white cement of great beauty and hardness.

Sulphide of antimony and iron dust, in equal proportions, stirred in with soluble glass, afford an exceedingly black cement; zinc dust and iron in equal proportions yield a hard, dark-gray cement.

As soluble glass can be kept on hand in liquid form, and the chalk and coloring matters are permanent and cheap, the colored cements can be readily prepared when wanted, and the material can be kept in stock, ready for use, at little expense. Soluble glass is fast becoming one of our most important articles of chemical production.

CEMENT, Curd.—Add $\frac{1}{2}$ a pint of vinegar to $\frac{1}{2}$ a pint of skimmed milk; mix the curd with the whites of 5 eggs, well beaten, and sufficient powdered quick-lime to form a paste. This cement will resist water and a moderate degree of heat.

CEMENT, Chinese.—1. Dissolve shellac in enough rectified spirit to make a liquid of the consistency of treacle.—2. Boil borax, 1 oz., and shellac, 1 oz., in water until dissolved.

CEMENT, Diamond.—1. Isinglass, 1 oz.; distilled vinegar, $5\frac{1}{2}$ oz.; spirits of wine, 2 oz.; gum ammoniacum, $\frac{1}{2}$ an oz.; gum mastic, $\frac{1}{2}$ an oz. Mix well.—2. Soak isinglass in water till it is soft; then dissolve it in the smallest possible quantity of proof spirit, by the aid of a gentle heat; in 2 oz. of this mixture dissolve 10 grains of ammoniacum, while still liquid add $\frac{1}{2}$ a drachm of mastic dissolved in 3 drachms of rectified spirit; stir well together. When to be used, liquify the cement by standing the bottle in hot water, and use it directly. The cement improves the oftener the bottle is thus warmed, and resists the action of water and moisture perfectly.—3. (Ure's.) Take 1 oz. of isinglass, 6 oz. of distilled water, boiled down to 3 oz., and $1\frac{1}{4}$ oz. of rectified spirit. Boil for 2 minutes, strain, and add, while hot, $\frac{1}{4}$ oz. of milky emulsion of ammoniac, and 5 drachms of tincture of gum mastic. This recipe, carefully followed, results in an excellent cement.

CEMENT, English Roman.—Take a bushel of lime slacked, with $3\frac{3}{4}$ lbs. of green copperas, 15 gals. of water, and $\frac{1}{4}$ of a bushel of fine gravel sand. The copperas should be dissolved in hot water; it must be stirred with a stick, and kept stirring continually while in use. Care should be taken to mix at once as much as may be requisite for one entire front, as it is very difficult to match the color again; and it ought to be mixed the same day it is used.

CEMENT, Entomologist's.—Equal parts of thick mastic varnish and isinglass size.

CEMENT, Elastic Collodion.—Ordinary collodion is made by dissolving 8 parts of gun-cotton in 125 parts of ether and 8 parts of alcohol. When used as a cement or varnish, it

becomes very hard, cracks easily, and peels off. It may be rendered elastic by the addition of 4 parts of Venetian turpentine and 2 parts of castor oil. When intended for surgical purposes, as a varnish, which, when dry, forms a perfectly close-fitting plaster, it has been found that the addition of some glycerine to the ordinary colloid, in which it is dissolved to a small extent, makes a varnish which adheres strongly to the skin, does not crack, and, on account of its elasticity, does not crease the skin.

CEMENT, Egg.—White of egg, thickened with finely-powdered quick-lime. Used to mend earthenware, glass, china, marble, alabaster, spar ornaments, etc. It does not resist moisture.

CEMENT, Electrical and Chemical.—(Singer's.) 1. Resin, 5 lbs.; wax and dry red ochre in fine powder, of each 1 lb.; plaster-of-Paris, 4 oz.; melt the first two, then add the ochre, and lastly the plaster.—2. Black resin, 7 lbs.; well dried red ochre and plaster, of each 1 lb.; as above. Used to cement the plates in voltaic troughs, join chemical vessels, etc.

CEMENT, French.—Make a thick mucilage with gum arabic and water, then add starch in fine powder to thicken it. Employed by naturalists and French artificial-flower makers. A little lemon juice is sometimes added.

CEMENT, German.—For glass or earthenware. 1. Take 2 parts of gum shellac, and 1 part of Venice turpentine; heat them together in an iron pot, taking care to keep the lid quite close, as the turpentine is very inflammable. When partially cool form into sticks; when it is wanted for use melt near a gentle fire.—2. 2 measures of litharge, and 1 each of unslaked lime and flint glass; each to be pulverized separately before mixing; then, to use it, wet it up with old drying oil.

CEMENT, Glass-grinder's.—1. Melt pitch, and add thereto $\frac{1}{4}$ of its weight each of finely-powdered wood-ashes and hard tallow. For coarse work.—2. Melt 4 lbs. of black resin, and then add 1 lb. each of beeswax and whiting, previously heated red hot, and still warm. Intended to fix articles while grinding.

CEMENT, Glycerine.—Glycerine and litharge, stirred to a paste, hardens rapidly, and makes a durable cement for iron upon iron, for two stone surfaces, and especially for fastening iron in stone. The cement is insoluble, and is not attacked by strong acids.

CEMENT, Hard.—1. To 4 or 5 parts of clay, thoroughly dried and pulverized, add 2 parts of fine iron filings free from oxide, 1 part of peroxide of manganese, $\frac{1}{2}$ of sea salt, and $\frac{1}{2}$ of borax. Mingle thoroughly and render as fine as possible, then reduce to a thick paste with the necessary quantity of water, mixing thoroughly. This should be used immediately. After application it should be exposed to heat, gradually increasing almost to white heat. This cement is very hard, and presents a complete resistance alike to red heat and boiling water.—2. To equal parts of sifted peroxide of manganese and well pulverized zinc white, add a sufficient quantity of commercial soluble glass to form a thin paste. This mixture, when used immediately, forms a cement quite equal in hardness and resistance to that obtained by the first method.

CEMENT, Hydraulic.—(Gad's.) Mix 3

lbs. of well-dried and powdered clay with 1 lb. of oxide of iron; then add as much boiled oil as will reduce them to a stiff paste. Used for work required to harden under water.

CEMENT, Hamelin's.—To any given weight of the earth or earths, commonly pit sand, river sand, rock sand, or any other sand of the same or the like nature, or pulverized earthenware or porcelain, add $\frac{1}{2}$ of the given weight of the earth or earths, commonly called Portland stone, Bath stone, or any other stone of the same or like nature, pulverized. To every 560 lbs. of these earths, so prepared, add 40 lbs. of litharge, and with the last-mentioned given weights combine 2 lbs. of pulverized glass or flint stone. Then join to this mixture 1 lb. of mintum and 2 lbs. of grey oxide of lead.

When this composition is intended to be made into cement, to every 605 lbs. of the composition are added 5 gals. of vegetable oil, as linseed oil, walnut oil, or pink oil. The composition is then mixed in a similar way to mortar.

When this cement is applied to the purpose of covering buildings intended to resemble stone, the surface of the building is washed with oil.

CEMENT, Iron-rust.—Take 100 parts iron filings, pounded and sifted; add 1 part sal ammonia. When it is applied, give it sufficiency of water to make it of paste consistency. This cement is used for filling up seams of iron.

CEMENT, Iron.—To make an iron cement suitable for making rust joints, mix thoroughly 112 lbs. of clean cast-iron borings, or turnings, with 8 oz. of sal ammonia, and 1 oz. of flower of sulphur, and add sufficient water. Keep wet when not to be immediately used, or it will heat and be spoiled.

CEMENT, India Rubber.—Dissolve 1 lb. of pure India rubber, divided into small fragments, in 4 gals. of rectified coal-tar naphtha, with frequent stirring. After 10 or 12 days double the quantity, by weight, of this liquid is added of shellac. This mixture is heated in an iron vessel having a discharge pipe at the bottom, and when the whole has become liquid it is drawn out upon slabs where it cools in the form of plates. When required for use it is heated in an iron vessel to a temperature of 258° , and applied with a brush to the surfaces to be joined. It is so strong that wooden beams and posts joined with it will break elsewhere before being divided at the place of splicing.

CEMENT, Japanese.—Intimately mix the best powdered rice with a little cold water, and then gradually add boiling water until a proper consistence is acquired, being particularly careful to keep it well stirred all the time; lastly, it must be boiled for 1 minute in a clean saucepan or earthen pipkin. This glue is beautifully white and transparent, for which reason it is well adapted for fancy paper work, which requires a strong and colorless cement.

CEMENT, Jeweller's.—Take 6 pieces of gum mastic the size of peas, and dissolve in the smallest possible quantity of alcohol. Soften some isinglass in water, and saturate strong brandy with it till you have 2 oz. of glue; then rub in 2 small pieces of sal ammoniac. Mix the 2 preparations at a heat. Keep well stoppered. Set the bottle in hot water before using. It is said by the Turks that this preparation will unite 2 metallic surfaces, even polished steel, so that they cannot be separated.

CEMENT, Kourie.—A new gum, obtained from trees in New Zealand, has been introduced. It is called kourie, and has been found to be a most excellent, strong, and waterproof cement for caulking tanks and cementing pieces of glass, stone or wood together. Before using it is fused and mixed with $\frac{1}{3}$ part of its weight of castor oil.

CEMENT, Liquid.—Cut gum shellac in 70 per cent. alcohol; put it in phials, and it is ready for use. Apply it to the edge of the broken dish with a feather, and hold it in a spirit lamp as long as the cement will simmer, then join together evenly, and when cold the dish will break in another place first, and is as strong as when new.

CEMENT, Microscopic.—Isinglass, 2 parts; gum, 1 part; water, 2 parts. Dissolve, then mix in alcohol, 1 part.

CEMENT, Optician's.—1. Shellac, softened with rectified spirits or wood naphtha. For fine work.—2. Melt wax, 1 oz., and rosin, 15 oz.; then add whitening, 4 oz., previously made red hot, and still warm. Used to fix glasses, stones, etc., while polishing and cutting.

CEMENT, Parabolic.—Curdle skim milk, press out the whey, and dry the curd by a gentle heat, but as quickly as possible. When it has become quite dry, grind it to powder in a coffee or pepper-mill, and mix it with one-sixteenth of its weight of finely-powdered quicklime, and a piece of camphor the size of a pea, also reduced to powder, to every ounce of the mixture. Keep it in wide-mouth 1 oz. phials, well corked. When to be used, make it into a paste with a little water, and apply it immediately.

CEMENT, Plumber's.—Melt black resin, 1 lb.; then stir in brick-dust, 1 to 2 lb.; sometimes a little tallow is added.

CEMENT, Peasley.—Prepare a solution of 200 parts of white glue in water; another one of 50 parts of isinglass, 3 of gum arabic, and 3 of tragacanth; and finally, another of 1 part of bleached shellac in alcohol. Then pour these 3 solutions together, mix them with 24 parts of white lead, and, at the last, 12 parts of the best glycerine, and 200 parts of alcohol. The mastic thus obtained should be immediately put up in bottles and well corked.

CEMENT, Rice Flour.—An admirable cement may be made from rice flour, which is at present used for that purpose in China and Japan. It is only necessary to incorporate the rice flour intimately with cold water, and gently simmer it over a fire, when it readily forms a delicate and durable cement, not only answering all the purposes of common paste, but admirably adapted for joining together paper, cards, etc., in forming the various beautiful and tasteful ornaments which afford much employment and amusement to the ladies. When made of the consistence of plaster clay, models, busts, bas-reliefs, etc., may be formed of it, and the articles, when dry, are susceptible of a high polish, and are also very durable.

CEMENT, Red.—This cement, which is employed by instrument makers for cementing glass to metals, and which is very cheap, and is very useful for a variety of purposes, is made by melting 5 parts of black resin, 1 part of yellow wax, and then stirring in gradually 1 part of red ochre or Venetian red, in fine powder, and pre-

viously well dried. This cement requires to be melted before use, and it adheres better if the objects to which it is applied are warmed.

CEMENT, Roman.—Genuine Roman cement consists of *puzzolene*, (a ferruginous clay from Puteoli, calcined by the fires of Vesuvius,) lime and sand, mixed up with soft water. The only preparation which the *puzzolene* undergoes is that of pounding and sifting; but the ingredients are occasionally incorporated with bullock's blood and oil, to give the composition more tenacity.

CEMENT, Seal Engraver's.—Common resin and brick-dust melted together. Used to fix the pieces of metal while cutting, and also to secure seals and tools in their handles. The older it gets the harder it grows.

SCHIOICAO.—A new Chinese composition, which has the property of making wood and other substances perfectly water-tight. It consists of 3 parts of blood, (deprived of its fibrine,) 4 parts of lime, and a little alum.

CEMENT, Water and Fire-proof.—To $\frac{1}{2}$ a pint of milk put an equal quantity of vinegar, in order to curdle it; then separate the curd from the whey, and incorporate the whey with 4 or 5 eggs, beating the whole well together. When it is well incorporated, add a little quicklime through a sieve, until it has acquired the consistence of a thick paste. With this broken vessels may be united. It resists water and, in a measure, fire.

CEMENT, Water.—Good gray clay, 4 parts; black oxide of manganese, 6 parts; good limestone, reduced to powder by sprinkling it with water, 90 parts; incorporate, calcine and powder.

GLUES.

GLUE, Cement.—Take of isinglass and parchment size, each 1 oz., sugar candy and gum tragacanth, each 2 drachms; add to them 1 oz. water, and boil the whole together till the solution appears (when cold) of the consistency of glue; then pour it into any form you please. If this glue be wet with the tongue, and rubbed on the edges of paper, silk or leather that are to be cemented, they will, being laid together, pressed slightly, and suffered to dry, be as firmly united as other parts of the substance.

GLUE, Flexible.—A German chemist has discovered that if glue or gelatine be incorporated with about $\frac{1}{4}$ of its weight of glycerine, it loses its brittleness, and becomes useful for many purposes for which it is otherwise unfit, such as dressing leather, giving elasticity to porcelain, parchment or enameled paper, and for bookbinding.

GLUE, How to Use It.—To do good gluing, the work must be well fitted, the parts to be glued well warmed, and the glue well cooked and brought to the proper consistency. Having clamps, hand-screws, etc., ready, after applying the glue put together immediately, bringing the parts firmly together, leaving no body of glue between. Finally, use only the best glue.

GLUE, its Manufacture.—Glue is principally prepared from the parings and waste-pieces of hides and skins, the refuse of tanneries, and the tendons and other offal of slaughter-houses. All these should be preferably obtained and kept in the dry state, to prevent decomposition. For use, they are first steeped for 14 or 15 days in

milk of lime, and then drained and dried; this constitutes the cleaning or the preparation. Before conversion into glue, they are usually again steeped in weak milk of lime, well washed in water, and exposed to the air for 24 hours. They are then placed in a copper boiler $\frac{3}{4}$ filled with water, and furnished with a perforated false bottom, to prevent them from burning, and as much is piled on as will fill the vessel and rest on the top of it. Heat is next applied, and gentle boiling continued until the liquor on cooling forms a firm gelatinous mass. The clear portion is then run off into another vessel, where it is kept hot by a water-bath, and allowed to repose for some hours to deposit, when it is run into the congealing boxes, and placed in a cool situation. The next morning the cold gelatinous masses are turned out upon boards wetted with water, and are cut horizontally into thin cakes with a stretched piece of brass wire, and then into smaller cakes with a moistened flat knife. These cakes are then placed upon nettings to dry, after which they are dipped one by one into hot water, and slightly rubbed with a brush wetted with boiling water, to give them a gloss; they are lastly stove-dried for sale. During this time the undissolved portion of skins, etc., left in the copper is treated with fresh water, and the whole operation is repeated again and again, as long as any gelatinous matter is extracted. The first runnings produce the palest and best glue. The refuse matter from the tanners and leather dressers yields on the average, when dried, 50 per cent. of its weight of glue.

LIQUID GLUE.—1. Dissolve bruised orange shellac in $\frac{3}{4}$ of its weight of rectified spirit, or of rectified wood naphtha, by a gentle heat. It is very useful as a general cement and substitute for glue.—2. Another kind may be made by dissolving 1 oz. of borax in 12 oz. of soft water, adding 2 oz. of bruised shellac, and boiling till dissolved, stirring it constantly.—3. Dissolve 1000 parts of glue in 1000 parts, by weight, of water, in a glazed pot over a gentle fire. When it is melted, add nitric acid (sp. gr. 1.32) 200 parts, pouring it in very gradually. An effervescence is caused by the escape of hyponitrous acid. When all the acid is added, allow the solution to cool.—4. Dissolve 1 part of powdered alum in 120 parts of water; add 120 parts of glue, 10 of acetic acid, and 40 of alcohol, and digest. Prepared glue is made by dissolving common glue in warm water, and then adding acetic acid (strong vinegar) to keep it. Dissolve 1 lb. of best glue in $1\frac{1}{2}$ pint of water, and add 1 pint of vinegar. It is ready for use.

LIQUID GLUE, for Labeling upon Tin.—Boiling water, 1 quart; borax, pulverized, 2 oz.; put in the borax; then add gum shellac, 4 oz., and boil until dissolved.

MARINE GLUE.—Mix together gum sandarac, $\frac{1}{4}$ lb.; gum mastic, $\frac{1}{4}$ lb., and methylated spirit, 8 lbs. When the gums are dissolved, add $\frac{1}{2}$ lb. turpentine, and incorporate this with a thick, hot solution of the best glue, (to which a little isinglass has been added to clarify it,) and filter through muslin. The marine glue will be impervious to moisture, and will not soften in any ordinarily hot weather.

MOUTH GLUE.—This article affords a very convenient means of uniting papers, and other small, light objects; it is made by dissolving, with the aid of heat, pure glue (as gel-

atine or parchment glue) with about $\frac{1}{4}$ of its weight of coarse brown sugar, in as small a quantity of boiling water as possible; this, when perfectly liquid, should be cast into thin cakes on a flat surface very slightly oiled, and as it cools cut up into pieces of a convenient size. When required for use, one end may be moistened by the mouth, and it is then ready to be rubbed on any substances it may be wished to join; a piece kept in the desk or work-box is very convenient.

PARCHMENT GLUE.—Parchment shavings, 1 lb.; water, 6 quarts. Boil until dissolved, then strain and evaporate slowly to the proper consistence. Use a water-bath if you want it very light colored.

PORTABLE GLUE, for Draughtsmen, etc.—Glue, 5 parts; sugar, 2 parts; water, 8 parts. Melt in a water-bath, and cast it in moulds. For use, dissolve in warm water.

SPAULDING'S GLUE.—First soak in cold water all the glue you wish to make at one time, using only glass, earthen or porcelain dishes; then by gentle heat dissolve the glue in the same water, and pour in a little nitric acid, sufficient to give the glue a sour taste, like vinegar, or 1 oz. to each lb. of glue.

WATER-PROOF GLUE.—1 oz. of gum sandarac and 1 oz. of mastic are to be dissolved together in a pint of alcohol, to which 1 oz. of white turpentine is to be added. At the same time a very thick glue is to be kept ready, mixed with a little isinglass. The solution of the resins in alcohol is to be heated to boiling in a glue pot, and the glue added gradually with constant stirring, so as to render the whole mass homogeneous. After the solution is strained through a cloth, it is ready for use, and is to be applied hot. It dries quickly and becomes very hard, and surfaces of wood united by it do not separate when immersed in water.

MUCILAGES.

MUCILAGE.—1. Put 3 oz. of gum arabic in an earthenware vessel containing $\frac{1}{2}$ a pint of cold water. If the liquid is occasionally stirred, the gum in 24 hours will be dissolved and the mixture ready for use. Cloves will keep it from moulding.—2. Fine clean glue, 1 lb.; gum arabic, 10 oz.; water, 1 quart; melt by heat in a glue kettle or water-bath; when entirely melted, add slowly 10 oz. strong nitric acid, and set off to cool. Then bottle, adding a couple of cloves to each bottle.

MUCILAGE, SALEP.—For a 6 oz. mixture, place into a flask 1 oz. of cold water, and 30 grs. of powdered salep; shake well together; then add 7 oz. of boiling water, with which the whole is shaken until nearly cold.

PASTES.

PASTE, That Will Keep a Year.—1. Dissolve a teaspoonful of alum in a quart of warm water. When cold, stir in as much flour as will give it the consistency of thick cream, being particular to beat up all the lumps; stir in as much powdered resin as will stand on a dime, and throw in half-a-dozen cloves to give a pleasant odor. Have on the fire a teacupful of boiling water; pour the flour mixture into it, stirring well all the time. In a very few minutes it will be of the consistency of mush. Pour it into an

earthen or china vessel; let it cool; lay a cover on, and put it in a cool place. When needed for use, take out a portion and soften it with warm water. Paste thus made will last 12 months. It is better than gum, as it does not gloss the paper, and can be written upon.—2. Prepare in the ordinary way a good flour or starch paste. It can be preserved by adding to it a small quantity of brown sugar, then corrosive sublimate in fine powder in the proportion of about a teaspoonful to the pint of paste; add also a teaspoonful of oil of lavender, or rosemary, or cloves, or any of the essential oils, and a few drops of carbolic acid, and stir well with a wooden spatula. This paste will keep for any length of time perfectly pure. The rationale is this: The corrosive sublimate insures it against fermentation, and the essential oil and carbolic acid against mold. Corrosive sublimate in the above is a poisonous agent, but it is not expected that the paste is to be eaten because of its containing sugar; and in the use of it as paste it is not in the least dangerous, as we all handle with impunity many things more poisonous than this.

PASTE, for Scrap Books.—Take the best of laundry starch in a clean dish, wet it with sufficient cold, soft water, to permit it being stirred smoothly. Pour on boiling water, slowly stirring until the starch is clear and jelly-like. Ready for use as soon as cool. For many uses preferable to a mucilage of gum Arabic.

PASTE, That Will Adhere to Any Substance.—Sugar-of-lead, 720 grs., and alum, 720 grs.; both are dissolved in water. Take $2\frac{1}{2}$ oz. of gum arabic and dissolve in 2 quarts of warm water. Mix in a dish 1 lb. of wheat flour with the gum water cold, till in pasty consistence. Put the dish on the fire, pour into it the mixture of alum and sugar-of-lead. Shake well, and take it off the fire when it shows signs of ebullition. Let the whole cool, and the paste is made. If the paste is too thick, add to it some gum water, till in proper consistence.

PUTTY.

GLAZIER'S PUTTY.—Whiting, 70 lbs.; boiled oil, 30 lbs.; water, 2 gals. Mix. If too thin, add more whiting; if too thick add more oil.

PUTTY, to Soften.—To remove old putty from broken windows, dip a small brush in nitromuriatic acid or caustic soda, (concentrated lye,) and with it anoint or paint over the dry putty that adheres to the broken glass and frames of your windows; after an hour's interval, the putty will have become so soft as to be easily removable.

SEALING-WAX.

SEALING-WAX.—(Red.) 1. Shellac (very pale) 4 oz.; cautiously melt in a bright copper pan over a clear charcoal fire, and when fused add Venice turpentine, $1\frac{1}{4}$ oz.; mix, and further add vermilion, 3 oz.; remove the pan from the fire, cool a little, weigh it into pieces, and roll them into circular sticks on a warm marble slab by means of a polished wooden block; or it may be poured into moulds while in a state of fusion. Some persons polish the sticks with a rag till quite cold.—2. (Fine.) Shellac, 3 lbs.; Venice turpentine, 19 oz.; finest cinnabar, 2 lbs.; mix as before.—3. (Fine.) As the last, but use just half as much vermilion.—4. Resin, 4 lbs.; shellac, 2 lbs.; Venice turpentine and red lead, of each $1\frac{1}{2}$ lbs. Common.

(Black.) 1. Shellac, 60 parts; very fine ivory-black, reduced to an impalpable powder, 30 parts; Venice turpentine, 20 parts.—2. (Fine.) As the last, but using lamp-black for ivory-black.—3. (Fine.) Rosin, 6 lbs.; shellac and Venice turpentine, of each 2 lbs.; lamp-black q. s. Inferior.

(Black Bottle-Wax.) 1. Black resin $6\frac{3}{4}$ lbs.; beeswax, $\frac{1}{8}$ lb.; finely-powdered ivory-black, 1 lb.; melt together.—2. (Red.) As the last, but substitute Venetian or red lead for ivory-black.

(French.) Shellac, (pale,) 3 lbs.; Venice turpentine, $1\frac{1}{4}$ lb.; vermilion, $3\frac{3}{4}$ lbs.; divide into sticks 12, 24, 36 or 40 to the lb. Fine.

(Gold.) By stirring gold-colored mica span-gles or talc, or aurum musivum into the melted resins when they begin to cool. Fine.

(Marbled.) By mixing 2 or 3 different colored kinds just as they begin to grow solid.

(Soft.) 1. (Red.) Beeswax, 8 parts; olive oil, 5 parts; melt, and add Venice turpentine 15 parts; red lead to color.—2. (Green.) As the last, but substitute powdered verdigris for red lead. Both are used for sealing certain official documents kept in tin boxes; also as a cement.

All the above forms for "fine" wax produce "superfine," by employing the best qualities of the ingredients; and "extra-superfine," or "scented," by adding 1 oz. of balsam of Peru or liquid storax to the ingredients when considerably cooled. The variegated and fancy-colored kinds are commonly scented with a little essence of musk, or ambergris, or any of the more fragrant essential oils. The addition of a little camphor or spirit of wine, makes sealing-wax burn easier. Sealing-wax adulterated with rosin, or which contains too much turpentine, runs into thin drops at the flame of a candle.

COOKING AND BAKING.

COOKING SUITABLE FOR INVALIDS IS MARKED *

ANCHOVY BUTTER.—Scrape the skin from a dozen fine anchovies, take the flesh from the bones, pound it smooth in a mortar; rub through a hair-sieve, put the anchovies into the mortar with $\frac{3}{4}$ of a pound of fresh butter, a

small quantity of cayenne, and a saltspoonful of grated nutmeg and mace; heat together until thoroughly blended. If to serve cold, mould the butter in small shapes, and turn it out. For preservation, press the butter into jars; keep cool.

APPLE BREAD.—A very light, pleasant bread is made in France by a mixture of apples and flour, in the proportion of 1 of the former to 2 of the latter. The usual quantity of yeast is employed as in making common bread, and is beaten with flour and warm pulp of the apples after they have boiled, and the dough is then considered as set; it is then put in a proper vessel, and allowed to rise for 8 or 12 hours, and then baked in long loaves. Very little water is requisite—none, generally, if the apples are very fresh.

APPLE SAUCE.—Pare and core 3 good-sized baking apples, and put them into a well-tinned pint saucepan, with two tablespoonfuls of cold water; cover the saucepan close, and set it on a trivet over a slow fire a couple of hours before dinner; some apples will take a long time stewing—others will be ready in 15 minutes; when the apples are done enough, pour off the water, let them stand a few minutes to get dry; then beat them up with a fork, with a bit of butter about as big as a nutmeg, and a teaspoonful of powdered sugar. Some add lemon-peel, grated or minced fine, or boil a bit with the apples. Some are fond of apple sauce with cold pork.

APPLE PUDDINGS.—1 lb. of flour, 6 oz. of very finely-minced beef suet; roll thin, and fill with $1\frac{1}{4}$ lbs. of boiling apples; add grated rind and strained juice of a small lemon; tie it in a cloth; boil 1 hour and 20 minutes, or longer, in the water. A small slice of fresh butter stirred into it when it is sweetened will be an acceptable addition; grated nutmeg, or cinnamon in fine powder, may be substituted for lemon-rind. For a richer pudding use $\frac{1}{2}$ a lb. of butter for the crust, and add to the apples a spoonful or two of orange or quince marmalade.—2. Pare 4 or 5 large, tart apples, and grate them fine; then make the following custard, into which stir the grated apple: Flour, 4 tablespoonfuls; 1 pint of milk, 5 eggs, and a little grated orange-peel. After you have these ingredients well mixed, pour them into your pudding-dish, and bake about $1\frac{1}{4}$ hours.

APPLE PUDDING, Baked.—4 large apples boiled, some grated bread, 4 oz. of butter, 4 yolks and 2 whites of eggs well beaten, sugar to taste; edge a dish with puff-paste, and bake $\frac{1}{2}$ an hour.

APPLE CAKE.—Take 2 cups of dried apples, stew just enough to cut easily, chop about as fine as raisins, and simmer in 2 cups of molasses 3 hours; 1 cup of sugar, 1 cup of sour milk, 1 of butter, 2 eggs, 5 cups of flour, 2 teaspoonfuls of soda, some salt, cloves and cinnamon. Mix with molasses warm. Put apples and molasses in before the flour. Bake in large cake dishes; it makes 1 large one, or 2 small ones.

APPLE CUSTARD.—1 pint of good stewed apples, a $\frac{1}{4}$ of a lb. of butter, $\frac{1}{2}$ a pint of cream, 3 eggs beaten light, sugar and grated nutmeg to taste. Mix the ingredients together, and bake in a puff-paste in a moderate stove.

APPLE CREAM.—Boil 12 apples in water till soft; take off the peel and press the pulp through a hair sieve upon $\frac{1}{2}$ a lb. of pounded sugar; whip the whites of 2 eggs, add them to the apples, and beat all together till it becomes very stiff and looks quite white. Serve it heaped up on a dish.

APPLE SNOW.—Put 12 good tart apples in cold water, and set them on a slow fire; when soft, drain off the water, strip the skins from the apples, core and lay them in a large glass dish. Beat the whites of 12 eggs to a stiff froth, put $\frac{1}{2}$ a pound of powdered white sugar to the apples; beat them and add the eggs. Beat the whole to a stiff snow, and turn into a dessert-dish.

APPLE SLUM.—Pare good cooking apples, put in an earthen dish with sugar, butter, and water enough for juice. Make a paste as for biscuit, only thin enough to spread easily with a spoon. Spread over the apples and bake $\frac{3}{4}$ of an hour. Berries and prunes may be used instead of apples, and make an equally palatable dish. Serve with a nice sauce.

APPLE SOUFFLE.—6 or 8 apples, some white sugar, yolks and whites of 3 eggs, $\frac{1}{4}$ of a pint of cream or new milk, sugar to taste. Peel and cut the apples; boil them with a little white sugar, and mash them smooth. Make a custard with the yolks of 3 well-beaten eggs, a $\frac{1}{4}$ of a pint of cream or new milk, and white sugar to taste. Have the apples and custard ready; make a ring round the dish with the apples, and put the custard in the middle. Whisk the whites of the eggs to a stiff froth, and put them over the custard and apples. Sift sugar over it, and bake it in a moderate oven.

APPLE FRITTERS.—Pare and core some fine large pippins, and cut them into round slices. Soak them in sugar, moistened with water, and nutmeg for 2 or 3 hours. Make a batter of 4 eggs, a tablespoonful of rose-water, and one of milk; thicken with enough flour, stirred in by degrees, to make a batter; mix it 2 or 3 hours before it is wanted, that it may be light. Heat some butter in a frying-pan; dip each slice of apple separately in the batter, and fry them brown; sift pounded sugar and grate nutmeg over them.

APPLE TRIFLE.—Stew 6 large apples; sift them, and add sugar, butter and nutmeg as for pies. Put in a deep dish. Take a pint of cream and 1 of milk and boil them. When boiling, add the beaten yolks of 6 eggs, and sugar. Stir until thick. When cold, pour it over the apple, bake, and when nearly done spread the whites of the eggs, beaten with lemon and sugar, on the top, and let it brown delicately.

APPLES, Floating Island of.—Bake or scald 8 or 9 large apples; when cold, pare them and pulp them through a sieve. Beat up this pulp with sugar, and add to it the whites of 4 or 5 eggs previously beaten up with a small quantity of rose-water. Mix this into the pulp a little at a time, and beat it until quite light. Heap it up on a dish, with a rich custard or jelly round it.

ARTICHOKES.—Soak them in cold water, and wash them well; put them into plenty of boiling water, with a handful of salt, and let them boil gently for $1\frac{1}{2}$ or 2 hours; trim them and drain on a sieve; send up melted butter with them, which some put into small cups, 1 for each guest.

ARTICHOKES, Boiled.—Twist off the stalks and wash them in cold water. When the water boils put them in with the tops down. They will be done in $1\frac{1}{2}$ hours. Serve with melted butter.

ARROWROOT BLANC-MANGE.—A tea-

cupful of arrowroot to a pint of milk; boil the milk with 12 sweet and 6 bitter almonds blanched and beaten; sweeten with loaf sugar, and strain it; break the arrowroot with a little of the milk as smooth as possible; pour the boiling milk upon it by degrees, stirring the while; put it back into the pan, and boil a few minutes, still stirring; dip the shape in cold water before you put it in, and turn it out when cold.

ASPARAGUS.—Scrape the stalks till they are clean; throw them into a pan of cold water; tie them up in bundles of about 25 each; cut off the stalks at the bottom all of a length, leaving enough to serve as a handle for the green part; put them into a stew-pan of boiling water, with a handful of salt in it. Let it boil, and skim it. When they are tender at the stalk, which will be in from 20 to 30 minutes, they are done enough. Watch the exact time of their becoming tender; take them up that instant. If too much boiled they lose both color and taste. While the asparagus is boiling, toast a round of a quarter loaf, about $\frac{1}{2}$ an inch thick; brown it delicately on both sides; dip it lightly in the liquor the asparagus was boiled in, and lay it in the middle of a dish, and lay the asparagus round the dish, the tops inwards.

ASPARAGUS SOUP.—2 quarts of good beef or veal steak, 4 onions, 2 or 3 turnips, some sweet herbs, and the white parts of 100 young asparagus; if old, half that quantity; and let them simmer till fit to be rubbed through a tammy; strain and season it; have ready the boiled green tops of the asparagus, and add them to the soup.

BAKING POWDER.—The following are the baking powders in general use: 1. Tartaric acid, $4\frac{1}{2}$ oz.; arrowroot or rice-flour, 5 oz.; mix.—2. Alum, 5 oz.; bicarbonate of soda, $2\frac{3}{4}$ oz.; bicarbonate of ammonia, $\frac{1}{2}$ oz.; arrowroot, 4 oz.

BEANS, To Cook.—The usual way people cook beans is to parboil them; put them in a kettle or pan, set them in the oven to bake, with a piece of fat pork in them. The grease oozes out into the beans, causing a most unwholesome and indigestible mass, destroying all the good flavor of the beans. Now the method for cooking them (which all who have tried it pronounce excellent) is as follows: Parboil as usual, putting in salt to suit the taste. Then put them in a pan and set in the oven to bake, putting in a piece of good, sweet butter—the size of a butter-nut will answer. Bake until tender and nicely browned over on top. Beans are very nutritious, and cooked in this way are palatable, digestible, and can be eaten by any one. If you want the pork, cook it in a dish by itself.

BEANS, Green.—(French style.) Choose small, young beans, and strip off the ends and stalks, throwing them, as prepared, into a dish full of cold spring water, and, when all are finished, wash and drain them well. Boil them in salted boiling water, in a large saucepan, and drain them, after which put them into an enameled stewpan, and shake them over the fire until they are quite hot and dry; then add about 3 oz. of fresh butter, and a tablespoonful of veal and chicken broth; the butter must be broken up into small lumps. Season with white pepper, salt, and the juice of half a lemon strained. Stir them well over a hot fire for 5 minutes, and serve them in a vegetable dish very hot.

BEEF, To Judge of its Quality.—The grain of ox beef, when good, is loose, the meat red, and the fat inclining to yellow. Cow beef, on the contrary, has a closer grain, a whiter fat, but meat scarcely as red as that of ox beef. Inferior beef, which is meat obtained from ill-fed animals, or from those which had become too old for food, may be known by a hard, skinny fat, a dark, red lean, and, in old animals, a line of horny texture running through the meat of the ribs. When meat pressed by the finger rises up quickly, it may be considered as that of an animal which was in its prime; when the dent made by pressure returns slowly, or remains visible, the animal had probably passed its prime, and the meat consequently must be of inferior quality.

BEEF, To Roast.—The noble sirloin of about 15 lbs., (if much thicker the outside will be done too much before the inside is enough,) will require to be before the fire about $3\frac{1}{2}$ or 4 hours. Take care to spit it evenly, that it may not be heavier on one side than the other; put a little clean dripping into the dripping-pan; (tie a sheet of paper over it to preserve the fat;) baste it well as soon as it is put down, and every $\frac{1}{4}$ of an hour all the time it is roasting, till the last $\frac{1}{2}$ hour; then take off the paper and make some gravy for it; stir the fire and make it clear; to brown and froth it, sprinkle a little salt over it, baste it with butter, and dredge it with flour; let it go a few minutes longer, till the froth rises; take it up, put it on the dish, etc.

BEEF, Rump of, To Bake.—Cut out the bone and break it, and beat the flesh with a rolling pin; season with pepper, salt, and cloves, and lard the meat across. Put the meat into an earthen pan, with the broken bones, some butter, bay leaves, whole butter, 1 or 2 shalots, and sweet herbs; cover it close, and place it in the oven; it will require 6 hours to bake. Skim off the fat, dish the meat, and serve with dried sippets and its own liquor.

BEEF, Leg of, To Bake.—Cut the meat off and break the bones. Put them all into an earthen pan with 2 onions and a bundle of sweet herbs, and season with whole pepper, cloves, and blades of mace. Cover it with water, tie the top close with brown paper, and put it in the oven. When done, take out the pieces of meat, lay them in a dish, and return them to the oven to keep hot. Skim off the fat and strain the liquor; pick out the bones and sinews, and put them in a saucepan with a little of the gravy, and butter rolled in flour. When hot pour it into the dish with the meat.

BEEF, Fillet of.—Take the sirloin or second cut of the ribs; take out the bones with a sharp knife, and skewer it round in good shape; lay the bones in a large saucepan, with 2 onions, 1 carrot, and 12 cloves; add the meat, just covered with water. Let it cook slowly 2 hours; dish the meat; skim all the fat from the gravy, add some flour mixed with cold water, and 2 spoonfuls of walnut catsup; give all a boil. Turn part of the gravy over the meat, and serve the rest in a gravy tureen.

BEEF COLLOPS.—Cut the fillet from the under part of a rump of beef into thin slices, and broil until nearly done; put into a stew-pan with a little beef stock; add slices of lemon, 2 tablespoons of catsup, and stew till tender; $\frac{1}{2}$ a pint of oysters is an improvement to this dish.

BEEF, Fillet of, with Mushrooms.—Cut the fillet into slices, and pour over them some melted butter, seasoned with pepper and salt; let them stand for an hour; then put them in a frying-pan over a quick fire to brown lightly; take them out, and put in the pan flour enough to thicken and brown; mix smoothly, and add some stock.

BEEF, Curried.—(Madras style.) Place 2 tablespoonfuls of butter in a saucepan, with 2 small onions cut in thin slices; fry until brown; add a tablespoonful and a half of curry powder, and mix all together. Take 3 pounds of beef; cut in pieces an inch square; pour over them the milk of a cocoanut, and a $\frac{1}{4}$ of the meat of the nut grated fine and squeezed through muslin with a little water; this softens the taste of the curry, and no curry is ever made without it in India. If there is not liquor enough, add $\frac{1}{2}$ a teacupful of boiling water; let the whole simmer for 30 minutes. Serve in a dish with sliced lemon, and a wall of mashed potatoes or boiled rice around it.

BEEF RISsoles.—Mince some cold roast beef fine, add rather more than $\frac{1}{2}$ as much bread-crumbs as meat, a little minced lemon-peel and chopped parsley, with salt, pepper, and sweet herbs minced, to taste. Make into a paste with 2 or more eggs, according to the quantity of meat; roll up into balls, and fry a rich brown; thicken a little good brown gravy; add to it a dessert spoonful of Worcester sauce, and pour it round the rissoles in a very hot dish.

BEEF, Stewed with Onions.—Cut some tender beef into small pieces, and season with salt and pepper; slice some onions and add to it, with water enough in the stew-pan to make a gravy. Let it stew slowly till the beef is thoroughly cooked, then add some pieces of butter rolled in flour, enough to make a rich gravy. Cold beef may be cooked before adding them to the meat. Add more water if it dries too fast, but let it be boiling when poured in.

BEEF HASH.—Take nice slices of cold sirloin or ribs of beef; cut off all the outside brown and gristle; make with these and the bones a brown gravy as directed; cut a good-sized carrot and turnip in small pieces; stew till tender; lay the slices of meat in a stew-pan with the carrot and turnip; pour over a pint of the gravy, thickened with a bit of butter rolled in flour, 6 pickled mushrooms, and 3 pickled walnuts cut in half. Set the stew-pan by the fire until the meat is thoroughly heated, but do not let it boil.

BEEF, CORNED, To Boil.—Wash it thoroughly, and put it in a pot that will hold plenty of water. The water should boil when the beef is put in, and great care should be taken to skim it often; $\frac{1}{2}$ an hour for every lb. of meat is sufficient time. Corn beef, to be tender and juicy, should boil very gently and long. If it is to be eaten cold, take it from the pot when boiled, and lay it in an earthen dish or pan, with a piece of board upon it, the size of the meat. Upon this put a heavy stone or couple of flat irons. It greatly improves salt meat to press it.

BEEF, Potted.—Salt 3 lbs. of lean beef, with $\frac{1}{2}$ a lb. of salt and $\frac{1}{2}$ an oz. of saltpetre. Let it stand 3 days. Divide it into pieces weighing a pound each, and put it in an earthen pan of

just sufficient size to contain it; pour over it $\frac{1}{2}$ a pint of water, cover it close with a plate, and set it in a slow oven for 4 hours. When taken from the oven, pour the gravy into a basin, shred the meat fine, moisten it with the gravy poured from the meat, and pound it thoroughly in a marble mortar, with fresh butter, until it becomes a fine paste; season it with black pepper and allspice, ground cloves, or grated nutmeg; put it in pots, press it down as closely as possible, put a weight on it, and let it stand all night; next day, cover it a $\frac{1}{4}$ of an inch thick with clarified butter, and tie paper over it.

BEEF CUTLETS.—Cut the inside of a sirloin or rump in slices $\frac{1}{2}$ an inch thick; trim them neatly; melt a little butter in a frying-pan; season the cutlets; fry them lightly; serve with tomato sauce.

*** BEEF TEA.**—Take 1 lb. of juicy rump steak, cut into oblong pieces an inch or two long by about $\frac{1}{4}$ of an inch wide, place them in a saucepan and just cover with cold water; set it on top of the stove, if there is a good fire, and with an iron spoon keep pressing out the juice from the meat, which at the end of 10 minutes will be almost perfectly white and tough as leather. 3 to 5 minutes boiling will finish it; then draw off the broth and rinse the meat with a little boiling water, to get off the nourishing particles which remain; add salt the last thing (on no account do this while the meat is cooking) and pepper to taste if allowed, and in 15 minutes you have a bowl of as good beef tea as was ever made.

BEEF BROTH.—Wash a leg or shin of beef; crack the bone well; (desire the butcher to do it for you;) add any trimmings of meat, game, or poultry, heads, necks, gizzards, feet, etc.; cover them with cold water; stir it up well from the bottom, and the moment it begins to simmer skim it carefully. Your broth must be perfectly clear and limpid, for on this depends the goodness of the soups, sauces and gravies of which it is the basis. Add some cold water to make the remaining scum rise, and skim it again. When the scum has done rising, and the surface of the broth is quite clear; put in 1 moderate-sized carrot, a head of celery, 2 turnips, and 2 onions; it should not have any taste of sweet herbs, spice or garlic, etc.; either of these flavors can easily be added after if desired; cover it close, set it by the side of the fire, and let it simmer very gently (so as not to waste the broth) for 4 or 5 hours or more, according to the weight of the meat; strain it through a sieve into a clean and dry stone pan, and set it into the coldest place you have, if for after use.

BEEFSTEAK, How to Cook.—The frying-pan being wiped dry, place it upon the stove and let it become hot. In the meantime mangle the steak—if it chance to be sirloin, so much the better—pepper and salt it, then lay it on the hot, dry pan, which instantly cover as tight as possible. When the raw flesh touches the heated pan, of course it seethes and adheres to it, but in a few seconds it becomes loosened and juicy. Every 30 seconds turn the steak; but be careful to keep it as much as possible under cover. When nearly done lay a small piece of butter upon it. In 3 minutes from the time the steak first goes into the pan it is ready for the table.

BEEFSTEAK AND ONIONS.—Cut the

steaks about $\frac{3}{4}$ of an inch thick; put a good lump of dripping or lard into your pan, and when it is hot lay in the steaks; turn them frequently, so that they may not burn; let them be nicely browned all over, and when cooked lay them in a hot dish before the fire; meantime have in readiness a plateful of onions, sliced very thin, and sprinkled with pepper and salt; put them into the pan, and lay a dish over them to keep in the steam; turn them about, and let them be cooked thoroughly. They will require a long time; they should be soft and brown; when done, pour them over the steaks and serve up hot.

BEEFSTEAK ROLLS.—Cut nice, small, thin steaks, and fry them slightly; make a stuffing as if for roast veal or turkey; roll up the steaks, putting the stuffing inside each roll; skewer or tie them neatly, stew them in a rich, brown gravy for 20 minutes, and serve.

BREAD, Yeast for.—Take 9 medium-sized potatoes, boil in 2 quarts of water, and mash them fine. Steep 1 cup of hops in $\frac{1}{2}$ a pint of hot water, and strain off, pressing the hops. Add together the potato-water, hop-water, the mashed potatoes, 2 tablespoonfuls of salt, 2 of good ground ginger, 1 cup of sugar, and when blood-warm add 1 cup of stock yeast, (such as here described,) or for first start use brewer's yeast; put in a jar and keep in a cool place, where it will not freeze, and it will keep good about 2 weeks. Let it stand at least 24 hours before using.

BREAD, To Make.—To make the sponge, which should be in the evening, take a deep vessel, put in 3 quarts of warm water, 1 cup of the above yeast, stir in flour enough to make a stiff batter, and set in a warm place. In the morning put in 2 quarts of warm water, salt it (if the dough inclines to be running, from bad flour, put in 1 teaspoonful of powdered alum dissolved in warm water.) Knead the dough till it is smooth, and cover it with a cloth in a deep vessel; keep it warm, (not hot,) let it rise, and then mold into 6 loaves, let it rise again till light, and then bake.

BREAD, French.—Put 1 pint of milk into 3 quarts of water. In winter let it be scalding hot, but in summer little more than milk-warm; put in salt sufficient. Take $1\frac{1}{2}$ pints of good ale-yeast, free from bitterness, and lay it in 1 gal. of water the night before. Pour off the yeast into the milk and water, and then break in rather more than $\frac{1}{4}$ lb. of butter. Work it well till it is dissolved; then beat up 2 eggs in a basin, and stir them in. Mix about $1\frac{1}{2}$ pecks of flour with the liquor, and, in winter, make the dough pretty stiff, but more slack in summer; mix it well, and the less it is worked the better. Stir the liquor into flour, as for pie-crust, and after the dough is made cover it with a cloth, and let it lie to rise while the oven is heating. When the rolls or loaves have lain in a quick oven about a $\frac{1}{4}$ of an hour, turn them on the other side for about a $\frac{1}{4}$ of an hour longer. Then take them out and chip them with a knife, which will make them look spongy, and of a fine yellow, whereas rasping takes off this fine color, and renders their look less inviting.

BREAD, Unfermented.—Take the iron pans now in use, and which can be obtained at almost any hardware store; or, if not obtainable, common patty tins will do; saturate a clean cloth

with oil or butter, with which rub the iron or tins, and set them on the stove to heat; then take sweet skim milk (not more than 24 hours old) warmed to the temperature of new milk or warm water, with 2 spoonfuls of cream to 1 pt. of water, and stir in fine flour until you have a batter a very little thicker than for griddle cakes; or if unbolted flour (which is much better) is used, until it will heap up slightly on the spoon; heat your dishes so that they will siss when the batter is put in, and have your oven well heated, until the cakes are puffed up and lightly browned. Then close the draft and bake slowly for 15 or 20 minutes, and you will have the best bread made.

BREAD, Graham.—Take 1 qt. of warm water, 1 teacupful of good yeast, and 1 tablespoonful of salt. Put into a pan, make a stiff batter with flour, which has been sifted, and keep it very warm until it is light; then take flour which has been half sifted to thicken it; knead it well, but do not let it get cold; let it rise again. Then work it down, and put in 1 teacupful of sugar and a piece of butter the size of an egg. Knead it $\frac{1}{2}$ an hour, put it in pans, and let it rise very light. Bake $\frac{3}{4}$ of an hour in a moderate oven.

BREAD, Oxygenated.—An article of diet termed oxygenated bread has of late been introduced into England, and found considerable favor. For its preparation the bread is placed under an air-pump, and the carbonic acid gas and atmospheric air exhausted, and then oxygen admitted in sufficient quantity to fill the pores of the bread. An inconvenience attending its use is its tendency to become mouldy. This can be obviated by avoiding the use of yeast, or by placing a paper saturated with a solution of carbonic acid on the top of the box in which the bread is preserved, this scarcely affecting the taste of the bread. A single mouthful of oxygenated bread is said to remove the want of appetite, and to induce an agreeable sensation in the epigastrium in dyspeptic attacks. In the case of gastric disturbances arising from nervous depression, incomplete assimilation, or scrofulous affections, it is said that the use of this bread produces a very sensible improvement in the course of 1 or 2 weeks.

BREAD, To Make Without Flour.—A Frenchman named Sezille has discovered a method of making bread from unground wheat, without first grinding and bolting it into flour. The making of bread by this new system is a three-fold process—namely, washing the wheat, fermentation, and the final admixture and flavoring. The grain is put in a vessel, covered with water, and stirred until the lighter grains and extraneous particles are either dissolved or left floating on the surface. The mass is then freed from the water and put into a cylinder, like a nutmeg-grater, whose revolutions remove the outer skin of the grain. This is all that is really necessary to remove. Next, the wheat thus cleansed is immersed in twice its own weight of water, heated to 75°, to which has been added 1 part of half-dry yeast, and 5 or 6 oz. of glucose to 200 parts of water. A day's exposure to this bath secures the necessary degree of absorption and fermentation, and the color will also have been extracted from the exterior surface of the grain. The water being then removed, the wheat will be not far from white in color. Next

the stiffened mass is put through rollers, which mash it into a glutinous pulp, and mix regularly through the whole bulk all the remaining particles of skin or bran. The dough—for such it now is—is then put into a trough, flavored with salt which has been dissolved in water, and given an opportunity to absorb more water if necessary, and then thoroughly kneaded by hand. Nothing, now, is needed but to treat it just as flour-dough is treated, and, when sufficiently light, hand it over to the oven. It is claimed that by this process the eater secures the entire nutriment of the wheat, and that it produces $\frac{1}{2}$ more bread than under the present system. It is probable that the bread thus made will lack that whiteness which is so much sought after by modest housewives, but then the result will be most nutritious. Owing, however, to the time consumed in preparing the grain for the oven, it is not likely that this new process will for some time to come supersede the old-fashioned method of setting a sponge over-night for the next day's baking.

BREAD, To Discover whether it is Adulterated with Alum.—The bread must be soaked in water, and to the water in which it has been soaked a little of the solution of muriate of lime must be added, upon which, if any alum be present, the liquid will be pervaded with milkiness; but if the bread be pure the liquid will remain limpid. Rationale: Sulphuric acid has a stronger affinity for lime than for the alumina and potash, with which it forms alum; it therefore quits those bodies to form sulphate of lime with the lime of the test, which produces the milkiness.

BREAD, Apple.—(French method.) Put $\frac{1}{2}$ of boiled apple pulp to $\frac{3}{4}$ of wheat flour, and ferment it with yeast for 12 hours. It is said to be light and palatable.

BREAD, Brown.—(Oneida.) 1 qt. of Indian meal, 1 qt. of rye meal, 1 teaspoonful of soda, $\frac{1}{2}$ a cup of molasses, with a slight sprinkling of salt. A little sour milk improves it. Mix to the consistency of pancake batter. Bake from 1 hour to $1\frac{1}{2}$ hours, according to the heat of your oven.

BREAD, Corn.—Take 1 pt. of corn meal, (white is best,) and stir into it 1 teaspoonful of dry saleratus and $\frac{1}{2}$ a teaspoonful of salt; then add 2 eggs, 1 pt. of sour milk, and 3 tablespoonfuls of sour cream; beat about 5 minutes, and put it (about $\frac{1}{2}$ an inch deep) in the pans to bake. Use pie pans to bake it in. If you have no cream, use about a tablespoonful of butter, drippings, or lard.

BREAD, Potato.—Take 4 or 5 good mealy potatoes, and after boiling peel and mash well; add a large spoonful of flour and enough hot water to make a thin batter; when cool enough add a small quantity of good yeast and a spoonful of sugar; set to rise in a moderately warm place, say by the stove or fireplace; it rises very quickly. When risen, take 2 large spoonfuls of it for 1 pt. and a $\frac{1}{2}$ of flour, a small spoonful of lard or butter, a $\frac{1}{2}$ pt. of milk, and hot water enough to make into a stiff batter, (over night;) beat well; next morning work it well into a smooth dough and make into rolls or loaves; set in a warm place to rise again, and bake in a quick oven. Do not forget a teaspoonful of salt and 1 of yeast powder sifted in the dry flour that you work into the batter in the morning; a

tin bucket is best, with a tight cover, and a towel between it and the bucket. If your flour is good, there is no better recipe than this; no hops are needed.

BREAD, RICE.—Take 1 lb. of rice, and boil it gently to a thick paste, which, when mixed with the usual quantity of yeast, will be sufficient to make 5 pounds of wheat or barley meal into a dough. When risen, bake it in the usual way.

BREAD, RYE.—Scald 1 cup of flour with 1 cup of boiling water, $\frac{1}{2}$ a teaspoonful of salt, 4 tablespoonfuls of molasses, a large cup of yeast, 3 cups of rye, 6 cups of flour, 3 cups of warm water; stir well with a spoon, set it to rise 12 hours.

BREAD, SAGO.—This light and nutritious article for invalids is made in the following manner: 2 lbs. of sago to be well soaked in water or milk for several hours; mix it with as much flour; add saleratus and good yeast, (a little Indian meal, if liked;) when well raised give it a handsome bake. It is delicious, healthy and cheap.

BREAD, WILLOW.—The leaves of our common or basket willow, (*Salix Nigra*, Marshall,) treated the same as is usual for hops, make an excellent yeast or leaven for light bread. The discovery was made this summer, and after thorough trial I was convinced that there is nothing equal to it, as it rises much quicker than hops—in half the time—imparts none of that hop flavor so disagreeable to some, and, in fact, makes better bread every way. The thing is well worthy the attention of every good housewife; and lest some should hesitate in consequence of not knowing the medical properties of the willow in question, I will add that it is a healthful tonic from which no harm can possibly arise.

BREAD, To Keep Moist.—Place in the bread pan a board pierced with holes, and so supported as to be a couple of inches from the bottom of the pan; let there be an inch depth of water in the pan; put the bread on the board, and cover the pan with the lid. The inclosed air will then prevent the bread from becoming too dry.

BREAD, To Serve at Table.—First, the bread-plate should be of wood, perfectly round, and with a flat surface. They cost at the shops from 75 cts. to \$6, or more. The high-priced ones are beautifully carved. Next a bread-knife, which has a wooden handle to match the plate. The blade should be thin and long, and the edge kept well sharpened. Bread dulls a knife very much.

Place on the table the bread-plate with a loaf of bread on it—2 loaves are better, 1 of white bread, the other of brown—and the knife. When it is time to serve the bread, the one nearest the bread-plate asks each one what kind is preferred, and if thick or thin slices. Where the table is large, a small plate is used to pass it on. In this way every one at the table has the bread cut to his or her liking. The bread is cut only as wanted, and no more cut than is used. The outside piece of either bread or meat must not be served, unless some one manifests a preference for it. Not much strength is required to cut meat and bread. The muscles of the wrist and hand should do the work, and not those of the arm, elbow, or shoulder.

BREAD PUDDING.—1 pt. of grated bread crumbs, 1 qt. of milk, yolks of 6 eggs well beaten, 1 grated lemon, and sugar to taste. Bake. When cold spread a layer of jelly over the top, then make an icing of the whites of the eggs and white sugar, and spread smoothly over the jelly. To be eaten cold without sauce.

BROSE, Athol.—This is a beverage peculiar to the Highlands of Scotland. Honey is dissolved in whisky to the consistence of cream; the drink is then taken with a teaspoon. A quantity sufficient to fill a wine-glass, taken at night, will be found of benefit in colds and catarrhs. In preparing Athol Brose oatmeal is occasionally added.

BROSE, Scotch.—Put a few handfuls of oatmeal into a wooden dish; then pour in a little boiling water, and mix thoroughly. Add a little salt. This dish is frequently used as a substitute for porridge, when it is inconvenient to cook the latter. Fresh milk added is a great improvement.

BEETS, Boiled.—Beets must not be cut before boiling, as the juice will escape and the sweetness be destroyed. Select small-sized, smooth roots, wash them nicely, and boil in clear water until tender. When sufficiently cooked, skim them into a pan of cold water, and slip off the skin. Cut them in thin slices, and, while hot, season with butter, salt, pepper and vinegar, and serve. If preferred cold, slice lengthwise and lay in strong, cold vinegar.

BISCUITS, Wine.—Take 2 lbs. of flour, 2 lbs. of butter, and 4 oz. of sifted loaf sugar. Rub the sugar and butter into the flour, and make it into a stiff paste with milk; pound it in a mortar, roll it out thin, and cut into sizes or shapes to fancy. Lay them on buttered paper in a warm oven, on iron plates, having first brushed them over with a little milk. When done, you can give them a gloss by brushing them over with a brush dipped in egg. A few caraway seeds may be added, if thought proper.

BISCUITS, English Seed.—1 lb. of flour, $\frac{1}{4}$ lb. of sugar, $\frac{1}{4}$ lb. of butter, $\frac{1}{2}$ oz. of caraway seeds, 3 eggs. Roll out, cut round, and bake in a moderate oven.

BROTH OF FRAGMENTS.—When you dress a large dinner, you may make good broth, or portable soup, at a very small cost, by taking care of all the trimmings and parings of the meat, game and poultry you are going to use; wash them well and put them in a stew-pan, with as much cold water as will cover them; set your stew-pan on a hot fire; when it boils, take off all the scum, and set it on again to simmer gently; put in 2 carrots, 2 turnips, a large onion, 2 blades of pounded mace, and 1 head of celery; some mushroom parings will be an addition. Let it continue to simmer gently for 4 or 5 hours, and then strain it through a sieve into a clean basin. This saves much expense in buying gravy meat.

BROCOLI, To Boil.—Strip off the leaves till you come to the top ones; peel off all the outside skin from the stalks and small branches, and throw them into water. Boil in accordance with the general directions. When the stalks are tender it is done. Serve in the same manner as asparagus.

BUNS.— $\frac{1}{2}$ a cup of butter, $\frac{1}{2}$ a cup of yeast, $\frac{1}{2}$ a cup of sugar, 1 cup of milk, and flour enough to make a batter like griddle-cakes.

Let this rise till light, then add $\frac{1}{4}$ of a cup of sugar, 1 cup of currants or stoned raisins, cinnamon or nutmeg to taste, a little more flour; let it rise again, put in $\frac{1}{2}$ of a teaspoonful of soda, cut in cakes, let them rise a third time, and then bake.

BUNS, Bath.—A $\frac{1}{4}$ of a lb. of flour, 4 yolks and 3 whites of eggs, with 4 spoonfuls of solid, fresh yeast. Beat in a bowl, and set before the fire to rise; then rub into 1 lb. of flour 10 oz. of butter; put in $\frac{1}{4}$ of a lb. of sugar and caraway comfits; when the eggs and yeast are pretty light, mix by degrees all together, throw a cloth over it, and set before the fire to rise. Make the buns, and when on the tins brush over with the yolk of egg and milk; strew them with caraway comfits; bake in a quick oven.

BUTTER, To Clarify.—Take butter, melt it in a warm bath, then let it settle, pour off the clear, and cool as quickly as possible. Butter prepared in this way will keep a long time good.

BUTTER, Rancid.—Rancid butter, if boiled in water with a portion of charcoal, (say a tenth part,) will be entirely divested of its rancidity, and may be used for cooking purposes, although its fine flavor will not be restored for the table.

CABBAGE, To Stew.—Parboil in milk and water, and drain it; then shred it, put it into a stew-pan, with a small piece of butter, a small teacupful of cream, and seasoning; and stew till tender.

CABBAGE SALAD.—This is a wholesome dish, as raw cabbage is much sooner digested than when cooked; a dressing of vinegar or sweet cream; shred it finely as for slaw.

CABBAGE (Cold Slaw).—Take fresh cabbage—white is preferable—wash, drain it, and cut off the stalks. Shave the head into very fine shreds with a cabbage cutter or sharp knife. Place it in a deep china or earthen dish, and prepare for it the following dressing: To $\frac{1}{2}$ a pt. of cider vinegar add a $\frac{1}{4}$ of a lb. of butter, cut in 5 or 6 bits and rolled in flour; add a small salt-spoon of salt. Stir well together, and boil in a saucepan. Have ready the yolks of 4 eggs, well beaten. When the mixture comes to a boil, remove it from the fire, and stir in the eggs. Pour this boiling hot over the cabbage, stir it thoroughly through with a spoon, and set it in ice or snow, or some cool place, to get thoroughly cold before being served at the table.

CAKES, ALMOND.—1. Take some sweet almonds, flour, and powdered sugar, of each $\frac{1}{4}$ lb., 7 eggs, and the outside yellow peel of 4 lemons shredded small. Pound the almonds, previously blanched, until they are very smooth, adding gradually the sugar and lemon-peel; then take them out, add the eggs, and beat the whole until it is as white as sponge-paste; next add the flour, work well, put it into well-buttered pans, and bake in a slack oven, with 8 or 10 thicknesses of paper under them and 1 over them.

CAKE, APPLE SHORT.—Pare and slice tart apples enough to fill 2 round pie plates; then make a crust of 1 teacupful of cream, salt and soda; roll an upper crust, and put on and bake; when done turn bottom upwards; put on sugar enough to taste; then turn again, and so on. To be eaten warm.

CAKES, BANBURY.—Work 1 lb. of butter into the same weight of dough, made for white bread, as in making puff paste; then roll it out very thin, and cut it into oval pieces, or as

the cakes are wanted. Mix some good moist sugar with an equal weight of currants, and wet them with water; then put a little upon each piece of paste; close them up, and place them on a tin with the closed side downwards and bake them. Flavor some powdered sugar with candied peel, grated, or essence of lemon, and sift a little over the cakes as soon as they come out of the oven.

CAKES, BATH.—Mix well together $\frac{1}{2}$ a lb. of butter, 1 lb. of flour, 5 eggs, and a cupful of yeast. Set the whole before the fire to rise, which effected, add 4 oz. of finely-powdered sugar and 1 oz. of caraways; roll the paste out into little cakes. Bake them on tins.

CAKE, BREAKFAST.—1 cup of sour cream, 1 teaspoonful of soda, 1 egg, 1 lump of butter the size of a hen's egg, a small teacupful of sugar, 1 cup of rye flour, and 1 cup of Indian meal; make and bake as stirred cake.

CAKES, CINNAMON.—1 cup of sugar; $\frac{3}{4}$ of a cup of molasses; 1 cup of butter; $1\frac{1}{2}$ tablespoonfuls of ground cinnamon; 2 level spoonfuls of soda, dissolved in 6 large tablespoonfuls of warm water; stir well, and add flour enough to allow to roll quite thin; cut out with a biscuit-cutter, and bake in a quick oven.

CAKE, CORN.—1. 1 pt. of buttermilk, 1 pt. of corn meal, 2 beaten eggs, 1 teaspoonful of soda; beat well together and bake in shallow tin pans. Increase quantities for more than 4 or 5 persons.—2. A pt. of buttermilk or sour milk, a pt. of corn meal, 1 egg, a teaspoonful of soda, 1 lb. of salt, 2 of sugar or molasses. Dissolve the soda in a little warm water, and add it the last thing. Bake $\frac{1}{2}$ an hour in a quick oven.

CAKE, BREAD.— $1\frac{1}{2}$ cups of dough, 1 cup of sugar, $\frac{1}{2}$ a cup of butter, 2 eggs, $\frac{1}{4}$ teaspoonful of soda. Raisins and spice to suit the taste. Mix with the hands until the dough seems thoroughly worked in, adding a little more flour if the dough is thin. Let it rise $\frac{1}{2}$ an hour. It rises slowly and but little before going into the oven.

CAKES, GRIDDLE (Wheatmeal).—Make a porridge with about 3 heaping spoonfuls of oatmeal, hominy, rice, or very coarse corn meal, in a pint of water. Boil 20 or 30 minutes, or if you have either of these articles already cooked, it can be made much quicker. Add 1 pint of cold water and wheat meal, sifting it slowly, enough to make a batter a little thicker than for raised griddle cakes. Bake on a slightly oiled or a soapstone griddle, spreading out with the spoon as you put them on. Bake them brown, and put them on each other as fast as cooked. Keep them close and warm, and let them stand 10 or 15 minutes before serving. If soft and sticky after standing, you have made them too thin.

CAKES, GINGER.—Make a paste with sugar, 1 lb.; powdered ginger, 4 oz.; flour, 2 lbs.; water, 1 pt.; butter, $\frac{1}{4}$ lb.; and 1 cup of candied orange peel, grated; form them into cakes, and prick them with a fork before baking them.

CAKE, CHOCOLATE PASTE.—2 cups of sugar, 1 cup of butter, 3 eggs, 3 cups of flour, $\frac{1}{4}$ of a cup of milk, $\frac{1}{4}$ a teaspoonful of soda, 1 teaspoonful of cream of tartar. *Paste:* Chocolate, 2 oz., 1 cup of sugar, $\frac{3}{4}$ of a cup of sweet milk; boil half down. This makes 1 cake of 4 layers with paste between.

CAKES, ICING FOR.—Beat the white of eggs to a full froth, and flavor with lemon or rose; then add gradually as much finely powdered sugar as will make it thick enough, beating it well all the time. Dust the cake over with flour, then gently rub it off, lay on the icing with a flat knife, stick on the ornaments while it is wet, and place it in the oven for a few minutes to harden, but not long enough to discolor it.

CAKES, JOHNNY.—Scald a quart of Indian meal with water enough to make a very thick batter, add 2 or 3 teaspoonfuls of salt, and mould it into small cakes with the hands. The hands must be well floured, or the batter will stick. Fry them in nearly sufficient fat to cover them. When brown on the under side turn them; cook them about 20 minutes. When done, split and butter them.

CAKES, LEMON.—Flour and sugar, of each 1 lb.; eggs, 1 dozen; grated peel and juice of 4 lemons; whisk the eggs to a high froth, and then gradually add the rest. Bake in small oval tins, well buttered, and place 6 thicknesses of paper beneath each tin. Thinly ice them.

CAKE, SPONGE.—Take 5 eggs, and $\frac{1}{2}$ a lb. of loaf sugar sifted; break the eggs upon the sugar, and beat all together with a fork for $\frac{1}{2}$ an hour. Previously take the weight of $2\frac{1}{2}$ eggs, in their shells, of flour. After you have beaten the eggs and sugar the time specified, grate in the rind of a lemon, (the juice may be added at pleasure,) stir in the flour, and immediately pour it into a tin lined with buttered paper, and let it be instantly put into rather a cool oven.

CAKE, SPONGE, CHEAP.—1 cup of white sugar, 1 egg, butter the size of a walnut; beat together; then take 1 cup of sweet milk, add $\frac{1}{2}$ teaspoonful of soda, 2 cups of flour, 1 teaspoonful of cream of tartar; flavor with anything you wish; mix well, and bake in pie pans 20 minutes.

CAKE SANDWICHES.—4 eggs, $\frac{1}{2}$ a lb. of pounded lump sugar, $\frac{1}{2}$ a lb. of fresh butter, $\frac{1}{2}$ a lb. of flour. Beat the butter to cream, dust in the flour, and add the eggs well whisked; beat with a fork for a $\frac{1}{4}$ of an hour, butter a tin, and pour in half of the mixture. Bake from a $\frac{1}{4}$ of an hour to 20 minutes. Remove from the tin, butter again, and add the other half of the mixture. Bake as before. When cool, spread jam thickly over 1 portion of the cake, place the other part over it, and cut into whatever shape you can.

CAKE, WEDDING.—4 lbs. of fine flour well dried, 4 lbs. of fresh butter, 2 lbs. of loaf sugar, a $\frac{1}{4}$ of a lb. of mace pounded and sifted fine, and the same of nutmegs. To every lb. of flour add 8 eggs; wash 4 lbs. of currants, and let them be well picked and dried before the fire; blanch 1 lb. of sweet almonds, and cut them lengthwise very thin; a lb. of citron, 1 lb. of candied orange, the same of candied lemon; $\frac{1}{4}$ a pint of brandy. When these are made ready, work the butter with your hand to a nice cream, then beat in your sugar for a $\frac{1}{4}$ of an hour; beat the whites of your eggs to a very strong froth, and mix them with your sugar and butter; beat your yolks $\frac{1}{2}$ an hour at least, and mix them with your cake; then put in your flour, mace and nutmeg; keep beating it well till your oven is ready; pour in the brandy, and

beat the currants and almonds lightly in. Tie 3 sheets of white paper round the bottom of your hoop to keep it from running out, rub it well with butter, put in your cake, lay the sweetmeats in layers, with cake between each layer, and after it is risen and colored cover it with paper before your oven is stopped up; it will require 3 hours to bake properly.

CAKE, YEAST.—Good-sized potatoes, 1 dozen; hops, 1 large handful; yeast, $\frac{1}{4}$ a pint; corn meal, a sufficient quantity. Boil the potatoes, after peeling, and rub them through a cullender; boil the hops in 2 quarts of water and strain into the potatoes; then scald sufficient Indian meal to make them the consistence of empytings, and stir in the yeast and let rise; then, with unsalted meal, thicken so as to roll out and cut into cakes, drying quickly at first to prevent souring. They keep better, and soak up quicker, than if made with flour.

CANDIES, To Clarify Sugar for.—To every lb. of sugar put a large cup of water, and put it in a brass or copper kettle, over a slow fire, for $\frac{1}{2}$ an hour; pour into it a small quantity of isinglass and gum Arabic dissolved together. This will cause all impurities to rise to the surface; skim it as it rises. Flavor accordingly to taste.

All kinds of sugar for candy are boiled as above directed. When boiling loaf sugar, add a tablespoonful of rum or vinegar, to prevent its becoming too brittle whilst making.

Loaf sugar when boiled, by pulling and making into small rolls, and twisting a little, will make what is called rock or snow. By pulling loaf sugar after it is boiled, you can make it as white as snow.

CANDY, CHOCOLATE CREAM.—Chocolate, scraped fine, $\frac{1}{4}$ oz.; thick cream, 1 pint; best sugar, 3 oz.; heat it nearly to boiling, then remove it from the fire, and mill it well. When cold add the whites of 4 or 5 eggs; whisk rapidly and take up the froth on a sieve; serve the cream in glasses, and pile up the froth on top of them.

CANDY, GINGER.—Boil a pint of clarified sugar until, upon taking out a drop of it on a piece of stick, it will become brittle when cold. Mix and stir up with it, for a common article, about a teaspoonful of ground ginger; if for a superior article, instead of the ground ginger, add the white of an egg, beaten up previously with fine sifted loaf sugar, and 20 drops of the strong essence of ginger.

CANDY, GINGER LOZENGE.—Dissolve in $\frac{1}{4}$ of a pint of hot water, 1 oz. of gum Arabic; when cold, stir it up with $1\frac{3}{4}$ lbs. of loaf sugar, and a spoonful of powdered ginger, or 12 drops of essence of ginger. Roll and beat the whole up into a paste; make it into a flat cake, and punch out the lozenges with a round stamp. Dry them near the fire or in an oven.

CANDY, EVERTON TAFEE.—To make this favorite and wholesome candy, take $1\frac{1}{4}$ lbs. of moist sugar, 3 oz. of butter, a teacup of water, and 1 lemon. Boil the sugar, butter, water and half the rind of the lemon together, and when done—which will be known by dropping into cold water, when it should be quite crisp; let it stand aside till the boiling has ceased, and then stir in the juice of the lemon. Butter a dish, and pour it in about a $\frac{1}{4}$ of an inch in

thickness. The fire must be quick, and the taffee stirred all the time.

CANDY, FRUIT.—Take 1 lb. of the best loaf sugar; dip each lump into a bowl of water, and put the sugar into your preserving kettle. Boil it down and skim it until perfectly clear, and in a candying state. When sufficiently boiled, have ready the fruits you wish to preserve. Large white grapes, oranges separated into very small pieces, or preserved fruits, taken out of their syrup and dried, are very nice. Dip the fruits into the prepared sugar while it is hot; put them in a cold place, and they will soon become hard.

CANDY, FIG.—Take 1 lb. of sugar and 1 pint of water, and set over a slow fire. When done, add a few drops of vinegar and a lump of butter, and put into pans in which split figs are laid.

CANDY, LEMON.—Take 3 lbs. of coarse, brown sugar; add to it 3 teacupfuls of water, and set it over a slow fire for $\frac{1}{2}$ an hour; put to it a little gum Arabic, dissolved in hot water; this is to clear it. Continue to take off the scum as long as any rises. When perfectly clear, try it by dipping a pipe-stem first into it and then into cold water, or by taking a spoonful of it into a saucer; if it is done it will snap like glass. Flavor with the essence of lemon, and cut it into sticks.

CANDY, MOLASSES.—1. 2 cups of molasses, 1 of sugar, 1 tablespoonful of vinegar, a piece of butter the size of walnut. Boil constantly for 20 minutes, stirring all the time; when cool enough to pull, do it quickly, as it will come white rapidly.—2. Take a clean tin or porcelain kettle of large size, so that there will be no danger of boiling over; put in a sufficient quantity of good molasses, place it over a good fire, and boil briskly until it will be brittle when cooled—which may be known by dipping a little of it into a dish of cold water; then pour into well buttered pans not over an inch thick. Let it cool until it can be handled, then pull smartly until white. Draw out on a clean table into sticks.

CANDY, Scotch Butter.—Take 1 lb. of sugar, and 1 pint of water; dissolve and boil. When done, add 1 tablespoonful of butter, and enough lemon juice and oil of lemon to flavor.

CANDY, Common Twist.—Boil 3 lbs. of common sugar and 1 pint of water over a slow fire for $\frac{1}{2}$ an hour without skimming. When boiled enough take it off; rub the hands over with butter; take that which is a little cooled and pull it, as you would molasses candy, until it is white; then twist or braid it, and cut it up in strips.

*** CALF'S-FOOT BROTH.**—Boil 2 feet in 3 quarts of water to $\frac{1}{2}$; strain and set it by for use. When required, take off the fat, put a large teacupful of the jelly into the saucepan with $\frac{3}{4}$ of a glass of white wine, a little sugar and nutmeg; heat it up till nearly boiling; then with a little of it beat up the yolk of an egg, add a bit of butter, and stir all together without allowing it to boil. A little fresh lemon peel may be grated into it.

CARROTS.—Let them be well washed and brushed, not scraped. An hour is enough for young spring carrots. Grown carrots must be cut in half, and will take from $1\frac{1}{4}$ to $2\frac{1}{4}$ hours. When done rub off the peels with a clean,

coarse cloth, and slice them in 2 or 4, according to their size. The best way to try if they are done enough is to pierce them with a fork.

CAULIFLOWER, To Boil.—Having cut off the green part, divide it into 4 parts; put it into boiling milk and water, and skim the saucepan well. When the stalks are tender, take them up carefully and put them to drain. Then put a spoonful of water into a stewpan, with a little flour, a $\frac{1}{4}$ of a lb. of butter, and pepper and salt mixed well together. Take half the cauliflower and cut it as for pickling; put it into the stewpan for 10 minutes. Place the stewed cauliflower in the middle, and the boiled round it, and pour over it the butter in which the one-half was stewed.

CAULIFLOWER, in Milk.—Choose those that are close and white, cut off the green leaves, and look carefully that there are no caterpillars about the stalk; soak an hour in cold water with a handful of salt in it; then boil them in milk and water, and take care to skim the saucepan, that not the least foulness may fall on the flower. It must be served very white and rather crimp.

CHARLOTTE DE RUSSE.—Take a little less than 1 oz. of gelatine, and dissolve in 1 pint of new milk. Strain into 1 pint of thick cream made very sweet, and set this in a cool place or on the ice. Take the whites of 7 eggs and beat to a froth; then add them to the cream, and beat light. Flavor with vanilla, and keep on the ice until wanted. Line the moulds with very light sponge cake, and fill with the above when wanted.

CHICKEN, To Fricassee.—Boil a chicken; joint it; lay it in a saucepan with a piece of butter the size of an egg, a tablespoonful of flour, a little mace or nutmeg, white pepper, and salt. Add a pint of cream, and let it boil up once. Serve hot on toast.

CHICKEN, BONELESS.—Fricassee your chicken, taking care to brown the skin nicely; season to taste. When done set by to cool; then remove all the bones; put back into the dish in which it was cooked. Take a chopping knife and chop finely, leaving in all the oil of the fowl; if not enough of that, add a piece of butter. Then pack closely in a dish, as you wish it to go to the table, and when your friends come to taste it, their approbation will more than repay you for the little extra trouble it has taken to prepare it.

CHICKENS, To Fry.—Cut up the chickens and lay them in cold water to extract the blood. Wipe them dry, season with pepper and salt, and dredge them with flour. Fry in lard to a rich brown; take them out and keep them near the fire; skim the gravy carefully in which the chickens have been fried, mix with it $\frac{1}{2}$ a pint of cream; season with mace, pepper, salt and parsley.

CHICKEN BROTH.—Cut a chicken into small pieces, and remove the skin and any fat that is visible; boil it for 20 minutes in about a quart of water, with a blade of mace, a slice of onion, and 10 corns of white pepper. Simmer slowly till the flavor is good. Beat a $\frac{1}{4}$ of an oz. of sweet almonds with a little water; add it to the broth, strain it, and when cold take off the fat.

CHICKEN POT-PIE.—Clean, singe, and joint a pair of chickens. Pare and slice 8 white

potatoes; wash the slices, and put with the pieces of chicken into a stewpan lined with pie-crust; season with salt and pepper, dredge with flour, and cover with water. Cover with paste, making a hole in the centre; cover the kettle, and either hang it over the fire or set it in the oven. If in the oven, turn occasionally to brown evenly. 2 hours' cooking is sufficient. When done, cut the upper crust into moderate-sized pieces and place them on a large dish; with a perforated ladle take up the potato and chicken, and put it upon the crust; cut the lower crust and put on the top. Serve the gravy hot in a gravy tureen.

CHOCOLATE BLANC-MANGE.—A $\frac{1}{4}$ of lb. of sweet German chocolate, $\frac{1}{2}$ a box of gelatine, 1 quart of milk, one coffee-cupful of sugar. Put it all in a dish, set in a kettle of water, and let it boil an hour. When nearly cold, turn into the mould.

CHOCOLATE CARAMEL.— $\frac{1}{2}$ a lb. of chocolate, 3 lbs. of dark brown sugar, $\frac{3}{4}$ of a lb. of butter, a small teacup of milk; season with vanilla, or grated lemon or orange-peel. Boil it very quickly over a hot fire, stirring constantly. When it becomes hard on being dropped in water, take it off the fire, and stir for a few moments before pouring into buttered dishes. Before it is quite cool cut into little squares. Those who like the caramel very hard need not stir it, as this makes it "sugary." The grated peel should not be put in till the caramel is taken from the fire.

CHOCOLATE CREAMS.—Take fresh milk enough to fill 12 glasses, and boil with it 2 oz. of grated chocolate and 6 oz. of white sugar; then beat the yolks of 6 eggs, to which add slowly the chocolate milk, turning slowly one way. Flavor with vanilla boiled in milk; when quite mixed, fill your cups and place in water and boil for an hour. Serve when cold.

CHOWDER, WEBSTER'S.—Daniel Webster was famous for the excellence of his chowder, and the following is his recipe for making it: 4 tablespoonfuls of onions fried with pork; 1 quart of boiled potatoes, well mashed; $1\frac{1}{2}$ lbs. of ship biscuit, broken; 1 teaspoonful of thyme; $\frac{1}{2}$ bottle of mushroom catsup; 1 bottle of port or claret; $\frac{1}{2}$ a nutmeg, grated; a few cloves, mace, allspice, and slices of lemon, and some black pepper; 6 lbs. of blue or white fish, cut in slices; 25 oysters. The whole to be put in a pot, covered with an inch of water, cooked slowly and stirred gently.

COCOA.—Boil 2 large spoonfuls of ground cocoa in a quart of water $\frac{3}{4}$ of an hour; skim off the oil, pour in 3 gills of milk, and boil it up again. It is the best way to make it the day before it is used, as the oily substance can be more perfectly removed when the cocoa is cold.

COCOA SHELLS.—Put a heaping teacupful to a quart of boiling water. Boil them a great while—say 2 or 3 hours. Scald milk as for coffee. If there is not time enough to boil the shells long enough before breakfast, it is well to soak them over night and boil them in the same water in the morning.

COCOANUT PIE.—Cut off the brown part of the cocoanut, grate the white part, mix it with milk, set it on the fire, and let it boil slowly 8 or 10 minutes. To 1 lb. of the grated cocoanut allow a quart of milk, 8 eggs, 4 tablespoonfuls of sifted white sugar, a glass of wine, a small

cracker pounded fine, 2 spoonfuls of melted butter, and $\frac{1}{4}$ a nutmeg. The eggs and sugar should be beaten together to a froth, then the wine stirred in. Put them into the milk and cocoanut, which should be first allowed to get quite cool; add the cracker and nutmeg, turn the whole into deep pie-plates, with a lining and rim of puff paste. Bake them as soon as turned into plates.

CODFISH BALLS.—Pick up as fine as possible a teacup of nice white codfish. Freshen all night, or, if wanted for any other meal than breakfast, from the morning. Scald it once, and drain off the water. Chop and work it until entirely fine. Put it in a basin with water, a bit of butter the size of an egg, and 2 eggs. Beat it thoroughly, and heat it until it thickens without boiling. It should, when all is mixed, be about 1 quart. Have some potatoes ready prepared and nicely mashed. Work the fish and potatoes thoroughly together as above, make it in flat cakes, and brown both sides.

CODFISH, PICKED-UP.—This is an old-fashioned dish and name, but none the less to be admired on that account, being with most persons, when properly prepared, a great favorite. Pick up the fish in small particles, separating the fibres as near as possible, the finer they are the better. Freshen by leaving it in water 1 hour. Pour off the water and fill up with fresh. Bring it to a scald, pour it off, and put on the fish just water enough to cover it. Add to a quart of the soaked fish a bit of butter the size of half an egg, a very little flour, and a dust of pepper. Beat up 2 eggs, and after taking off the fish thicken it by stirring in the egg. Some let it boil after the egg is added, but if this is done the egg will be curdled.

COFFEE, To Make Good.—In order to make good coffee, a practical cook says that the first thing necessary is to never allow an ounce of ground coffee to come into the house. If no one understands the art of roasting coffee, then buy it ready roasted, and try and find a dealer who has not soaked all the essential juices from the coffee before putting it into his oven. If the roasted berry is about twice as large as when in its green state, depend upon it you have been defrauded. Get an earthen pot—you cannot make good coffee or tea in a tin vessel—and put the ground coffee in a clean white flannel bag, and be sure to put enough in, and drop the bag into the pot. Pour on boiling water and let it steep; do not boil it. The coffee will steep in 20 minutes. Never break an egg into coffee, and never fill up with water the second time. Pour on in the beginning the amount of water needed. An ordinary teacupful of ground coffee is sufficient for 3 persons. Use Java, Mocha, or Java and Rio mixed. Follow this recipe, and you will never complain of poor coffee.

COFFEE, Substitutes for.—Roasted acorn, the chick pea, beans, rye, and other grains; nuts, almonds, and wheaten bread; the dried and roasted roots of turnip, carrot, and dandelion.

CORN STARCH BLANC-MANGE.—Boil 1 quart of sweet milk; stir into it gradually 5 tablespoonfuls of corn starch, mixed with milk; add salt, and only 2 large spoonfuls of loaf sugar, and stir until thoroughly cooked. When done, take it from the fire, and when cooled add lemon and vanilla, and pour it into moulds.

Serve with jelly or fresh fruit, and whipped cream flavored like the pudding.

COOKIES.—1 large cup of butter; 2 cups of sugar; 3 well beaten eggs; $\frac{1}{2}$ a cup of sour cream; 1 level teaspoonful of soda; cinnamon or caraway seeds, and flour enough to roll.

COLLOPS, MINCED.—A favorite Scotch dish. Take 2 lbs. of good beefsteak, mince it quite fine, and free from fat or skin; put into a deep frying-pan with a good-sized piece of butter. As the butter melts, stir the mince about with a silver fork, so as to separate the particles and give the mince a granulated appearance; as soon as the meat looks white, put in a teacupful of clear gravy, a little pepper and salt, and either mushroom catsup or Worcester sauce enough to flavor it; a minced onion may be used if there is no objection to its taste. Stir the mince about till the gravy begins to boil, then serve with toasted sippets.

COOKING UTENSILS, Caution About.—Cleanliness has been aptly styled the cardinal virtue of cooks. Food is more healthy as well as palatable when cooked in a cleanly manner. Many lives have been lost in consequence of carelessness in using brass, copper, and glazed earthen cooking utensils. The two first should be thoroughly cleansed with salt and hot vinegar before cooking in them, and no oily or acid substance, after being cooked, should be allowed to cool or remain in any of them.

COOKING, Average Loss by.—It is well to know that 100 lb. of beef, loses 6 lb. in boiling and in baking, 30 lbs. Mutton, by boiling, 21 lbs. and by roasting, 24 lbs; or, in another form of statement, a leg of mutton costing, raw 25 cents, would cost, boiled and prepared for the table, 28 $\frac{1}{2}$ cents per lb; boiled fresh beef would, at 15 cents per lb., cost 19 $\frac{1}{4}$ cents; a sirloin of raw beef, at 30 cents, costs, roasted, 42 cents; while a leg of mutton, at 15 cents, would cost, roasted, only 22 cents.

CRANBERRY SAUCE.—To stew cranberries, a quart of berries, a pint of brown sugar, and a pint of water; place all in a porcelain kettle, cover closely, and allow them to cook 8 minutes after coming to a boil, without stirring; remove from the fire, and empty into an earthen dish to cool.

CRACKERS, Wheat Flour.—1 qt. of flour, 4 oz. of butter or lard, $\frac{1}{2}$ a teaspoon of soda, and the same of salt; sweet milk. Rub the butter thoroughly into the flour and salt; dissolve the soda in the milk, and enough more to take up the flour, which should be made into a very stiff dough; the more the dough is pounded or kneaded the better the crackers; roll out to the desired thickness— $\frac{1}{4}$ of an inch—and bake quickly.

CREAM, ICE.—Have rich, sweet cream, $\frac{1}{2}$ a lb. of loaf sugar to each quart of cream or milk. If you cannot get cream, the best imitation is to boil a soft custard, 6 eggs to each quart of milk, (eggs well beat.) Or another is made as follows: Boil 1 quart of milk, and stir into it, while boiling, 1 tablespoonful of arrow-root wet with cold milk; when cool, stir into it the yolk of 1 egg to give it a rich color. 5 minutes' boiling is enough for either plan. Put the sugar in after they cool; keep the same proportions for any amount desired. Or thus: To 6 quarts of milk add $\frac{1}{2}$ lb. of Oswego starch, first dissolved; put the starch in 1 quart of the milk;

then mix altogether, and simmer a little (not boil); sweeten and flavor to your taste; excellent. The juice of strawberries or raspberries gives a beautiful color and flavor to ice creams, or about $\frac{1}{2}$ oz. essence or extracts to 1 gallon, or to suit the taste. Have your ice well broken; 1 quart of salt to a bucket of ice. About $\frac{1}{2}$ an hour's constant stirring, with occasional scraping down and beating together, will freeze it sufficiently.

CRULLERS.— $\frac{1}{2}$ a lb. of butter, $\frac{3}{4}$ of a lb. of sugar, 2 lbs. of flour, 1 nutmeg, $\frac{1}{2}$ a teaspoonful of soda dissolved in $\frac{1}{2}$ a teacup of water or milk; 6 eggs.

CUCUMBER SALAD.—To 100 cucumbers add a $\frac{1}{4}$ of a peck of small onions. Peel both and cut them into thin slices; cover with salt, and stand in the sun for 6 hours; rinse clean, and stand in clear cold water for 1 hour. For the dressing take a box of the best mustard, put into it a little salt, pour in sufficient olive oil to stir it easily, and add vinegar and oil alternately till thin enough to pour smoothly. Put the cucumbers in jars, cover with the dressing, and cover closely. Seal the jars.

CUSTARD, Baked.—Boil in a pint of milk a few coriander seeds, a little cinnamon and lemon-peel; sweeten with 4 oz. of loaf sugar; mix with it a pint of cold milk; beat 8 eggs for 10 minutes; add the other ingredients; pour it from one pan into another 6 or 8 times; strain through a sieve; let it stand; skim the froth from the top, fill it in earthen cups, and bake immediately in a hot oven; give them a good color; 15 minutes will do them.

CUSTARD, Boiled.—Boil a quart of milk with a little cinnamon, and half a lemon peel; sweeten it with nice white sugar, strain it, and when a little cooled mix in gradually 7 well beaten eggs and a tablespoonful of rose-water; stir all together over a slow fire till it is of proper thickness, and then pour it into your glasses. This makes good boiled custard.

CUSTARD FRITTERS.—Beat the yolks of 4 eggs with a dessert spoonful of flour, a little nutmeg, salt and brandy; add half a pint of cream; sweeten it to taste, and bake it in a small dish for a $\frac{1}{4}$ of an hour. When cold, cut it into quarters, and dip them into a batter made with a $\frac{1}{4}$ of a pint each of milk and cream, the whites of the 4 eggs, a little flour, and a good bit of grated ginger; fry them brown; grate sugar over them, and serve them as hot as possible.

DOUGHNUTS.—Half a cup of butter, $2\frac{3}{4}$ cups of sugar well rolled and sifted, 4 eggs, 1 teaspoonful of saleratus, 1 cup of sour milk, 1 nutmeg, flour enough to roll; cut in any shape desired, either in strips or twisted; have the lard hot enough for the cakes to rise to the surface as soon as put in. This is an excellent fried cake.

EGGS, Hard and Soft Boiled.—It is understood that eggs are more easily digested if "rare" than "well" done; but which portion of the egg resists digestion—the "white," which is nearly pure albumen, or the yolk? Lately, experiments have been made in this direction, with ample opportunity of demonstrating that healthy gastric juice, which the stomach secretes for purposes of digestion, will not act readily on coagulated white of egg, even if cut in pieces not larger than ordinary peas, (and that is as fine as

people usually chew their food,) while it acts with facility upon the more brittle yolk. The reason is that the coagulated albumen is very compact and tenacious, and would need to be "ground to powder" to accept the chemical affinities of the gastric juice.

Pour into a basin boiling water sufficient to cover the eggs, put the eggs into the water and let them remain 10 or 15 minutes, according to circumstances and your own taste; keep the water nearly up to boiling temperature, but do not boil the eggs. Fresh eggs will cook more quickly than old ones, and, of course, small ones quicker than large ones. By this process you will find the yolks well cooked, while the white is left in a condition to digest readily.

EGGS, BROILED.—Cut a large round of bread; toast it on both sides, and butter it. Carefully break 6 eggs, and arrange them upon the toast; sprinkle over them some salt and pepper, and slowly pass a red-hot shovel up and down over them until they are well set. Squeeze upon them the juice of an orange, and strew over a little grated nutmeg. Serve as quickly as possible. If preferred, the toasted bread may be dipped into some warmed cream, and some poached eggs placed upon it, and then glazed with a red-hot shovel.

EGGS, To Poach.—The beauty of a poached egg, like a fried one, consists in having the white just sufficiently hardened to form a transparent veil for the yolk. Pour from a tea-kettle as much boiling water as you shall need, through a clean cloth into a stew-pan; it should be half filled. Break the eggs separately into a cup or saucer, and when the water boils remove the pan from the heat, and gently slip the eggs in; when the white is set replace the pan over the fire, (which should be moderate,) and as soon as the water boils the eggs are done; remove them with a slice and trim off the ragged edges. If served on toast, cut the bread in pieces a little larger than the egg, and about $\frac{1}{4}$ of an inch thick; brown only on one side, and just enough to give a yellow color; too much browning yields a bitter flavor. The toast may be moistened with a little hot water. Some sprinkle on it a few drops of vinegar or essence of anchovy sauce.

EGG OMELETTE.—Unless a great omelette is to be made, a small frying pan should be used, so as to insure thickness. 5 or 6 eggs will make a good sized omelette. Beat them well with a fork or egg beater; add a salt spoon of salt; put 2 oz. of butter in the frying pan; when melted pour in the omelette (beaten eggs,) stir with a spoon until it begins to set, then turn it up all around the edges, and when it is of a nice brown it is done. To take it out, turn a hot plate over the omelette, and turn the pan upside down. Double it over like a turn-over, and serve hot. If not sufficiently done on the top, brown with a salamander or a heated shovel. To have the omelette particularly fine, about as many whites as yolks should be used.

EGGS, To Test.—One way to tell good eggs is to put them in a pail of water, and if they are good they will lie on their sides always; if bad, they will stand on their small ends, the large end always uppermost, unless they have been shaken considerably, when they will stand either end up. Therefore, a bad egg can be told by the way it rests in the water—always up, never

on its side. Any egg that lies flat is good to eat, and can be depended upon. An ordinary way is to take them into a room moderately dark, and hold them between the eye and a candle or lamp. If the egg be good—that is if the albumen is still unaffected—the light will shine through with a reddish glow; while, if affected, it will be opaque or dark.

FISH, To Choose.—All fish, of whatever species, may be known to be perfectly fresh by their being rigid and having bright eyes.

FISH, To Boil.—The proper sign that fish is done by boiling is that the flesh separates readily from the bone, and has lost all appearance of redness and transparency. It is important that this should be kept in view, as fish underdone is unwholesome. The opposite extreme, however, must also be carefully guarded against.

FISH SAUCE.—Take $\frac{1}{2}$ a pint of milk and cream together, 2 eggs well beaten, salt, a little pepper, and part of the juice of a lemon. Put it over the fire and stir it constantly until it begins to thicken.

FISH CHOWDER.—Haddock and Striped Bass are generally considered the best fish for chowder. Cut the fish in pieces about 1 inch thick and 2 inches square. Cut 5 or 6 good slices of the best salt pork, lay them in the bottom of an iron pot and fry till crisped, but do not scorch; take out the pork, leaving the fat, and chop the pork in small pieces; put into the pot a layer of fish, a layer of split crackers and some of the chopped pork; a little red and black pepper; a little chopped onion; then another layer of split crackers, fish and seasoning, and so on till all the fish is used. Then just cover all with water, and stew slowly till all is tender. Thicken the gravy with cracker crumbs and catsup if you like; take out the fish, boil up the gravy once, squeeze in the juice of a lemon, and pour the gravy over the fish. Add salt if necessary.

FISH, To Freshen Salt.—Many persons who are in the habit of freshening mackerel, or other salt fish, never dream that there is a right and wrong way to do it. Any person who has seen the process of evaporation going on at the salt works, knows that the salt falls to the bottom. Just so it is in the pan where your mackerel or white fish lies soaking; and, as it lies with the skin side down, the salt will fall to the skin, and there remain; when, if placed with the flesh side down, the salt falls to the bottom of the pan, and the fish comes out freshened as it should be. In the other case it is nearly as salt as when put in.

FRUIT CAKE.—1 lb. of flour, 1 of sugar, 1 of butter, 12 eggs, 2 lbs. of currants, 2 of raisins, 1 of citron; lemon, nutmeg, and mace to taste. Beat it very light. The fruit should be floured and stirred in last, and more flour added if necessary. Bake in 1 large pan in a steady, well-heated oven for 4 or 5 hours, letting it cool gradually in the oven. When perfectly cold it may be frosted.

FRUIT AND VEGETABLES, To Take Frost out of.—When a thaw approaches put the frozen articles in cold water, allowing them to remain in it until, by their plump, fair appearance, the frost seems to be out.

FRYING.—This is one of the worst methods of cookery that can be adopted. It cannot be accomplished without the aid of oil or fat, which

beyond question tends to render the meat very indigestible. It is no less injurious to vegetables. As an example of this it may be stated that the potato when fried becomes waxy in its texture, and often produces derangement of the stomach in healthy and vigorous persons.

FLOUR, How to Know Good.—1. When flour is genuine or of the best kind, it holds together in a mass when squeezed by the hand, and shows the impressions of the fingers, and even of the marks of the skin, much longer than when it is bad or adulterated; and the dough made with it is very glucy, ductile, elastic, and easy to be kneaded; and may be elongated, flattened, and drawn in every direction without breaking.—2. Adulterated flour will be found to be heavier than pure flour—that is to say, a pint of pure flour would be overbalanced in the scales by a pint of adulterated flour.—3. Knead a little between your fingers; if it works soft, sticky, it is poor.—4. Put some flour on a table and blow it gently with your breath. If little heaps remain upon the table, resisting the action of your breath, and differing manifestly from the indications given by other portions when blown upon, the substance thus remaining is impure.—5. Place a thimbleful in the palm of your hand and rub it gently with the finger. If the flour smooths down, feeling smooth and slippery, it is of an inferior quality. But if the flour rubs rough in the palm, feeling like fine sand, and has an orange tint, purchase confidently.—6. Bake a small quantity of the suspected flour (in its dry state) until it is a full brown; then take it and rub it in your hands or on a table, and white particles will be seen if either chalk or plaster-of-Paris should be present in the flour.

FLOUR, To Restore and Improve Musty.—Carbonate of magnesia, 3 parts; flour, 760 parts. Mix, and use the flour in the usual way. This will not only greatly improve bad flour, but the bread will be much lighter, more wholesome, and keep longer than when alum is used.

FOWLS, Choice of.—If a cock, choose with short spurs, observing that they have not been pared or cut; if a hen, her comb and legs must be smooth; when old they are rough, and on the breast long hairs are found instead of feathers; smell them whether they are fresh, and feel whether the breast-bone is well-covered; if not, they have probably died from disease.

FOWL, To Broil.—Slit the fowl down the back, and score to the bone all the thicker parts, as the thighs and breast, in order to its being all equally done. Brush over the inside and the places scored with catsup and pepper, and broil over a clear fire. A sauce should be made of butter and flour melted brown, into which, when taken from the fire, should be put capers or button mushrooms.

FOWL AND CHICKENS, To Roast.—Put them down to a good fire, and baste them well with butter. A fowl will require nearly an hour to roast, and a chicken about a $\frac{1}{4}$ of an hour or 20 minutes. For the fowl let a gravy be made of the neck and gizzard, and when strained put in a spoonful of browning. Serve the chicken with parsley and butter.

FOWLS, How to Cook Old.—Prepare as for roasting; then boil 3 hours in a covered pot, with 1 quart of water, to which add 2 tablespoonfuls of vinegar; after which put into a pan in a hot oven for about 1 hour to brown. The liquor

in the pot is to be prepared for gravy; should the water boil away too much more must be added. The result is, the meat is as tender as young chicken, and some think richer and better.

FOWLS, Sauce for.—An excellent white sauce for fowls may be made of 2 oz. of butter, 2 small onions, 1 carrot, $\frac{1}{2}$ a teacupful of flour, 1 pint of new milk, salt and pepper to taste. Cut up the onions and carrots very small, and put them into a stew-pan with the butter; simmer them until the butter is nearly dried up; then stir in the flour and add the milk. Boil the whole gently until it thickens, strain it, season with salt and Cayenne, and serve.

FOWLS, Stewed with Onion.—Wash it clean, dry and truss it as for boiling; put a little pepper and salt into it, and rub it with butter; butter a saucepan; put the fowl in the pan with a pint of veal stock or water, seasoned with pepper and salt. Turn it while stewing, and when quite tender add 12 small onions, split. Stew all together for $\frac{1}{2}$ an hour. A young fowl will take 1 hour, an old one 3 hours to stew.

GEESSE, To Choose.—A young goose has a yellow bill; if red, it is a sign of age; if fresh, the feet will be pliable, but stale if stiff and dry.

GOOSE, ROAST.—Presuming that the bird is carefully plucked, singed, washed, and dried, put into it a seasoning of onions, sage, pepper, and salt, fastening tightly the neck and rump. Put it at first at a distance from the fire; paper the breast-bone; baste well, and when the breast is rising take the paper off. Let good gravy be sent in the dish. Serve with potatoes, gravy, and apple sauce.

GOOSE, BOILED.—Having singed the goose, pour over it a quart of boiling milk; let it lie all night in the milk, after which take it out and dry it well; stuff it with sage and onion, cut small; sew up the openings, and hang it up for a day. Boil for 1 hour, and serve with onion sauce.

GEMS.—They are cheap, easily made, wholesome and palatable. Graham flour and water are stirred together to the consistency of a thick pancake batter, and baked in the iron or tin gem pans. Gems, whether of Graham meal, fine flour, or corn meal, should be put into a hot oven. Success depends on this. Fine flour and sweet milk, (skimmed milk is good enough,) well beaten together, rather thicker than the batter, makes a very sweet and good kind of warm bread. Corn bread of the best kind can be made without eggs or shortening, or sweetening. Simply scald the meal with boiling water, add a little salt, stir well and bake quickly in the gem pans. We thought the Graham and white gems must have salt, until we found that its absence was not observed, and then we discarded it, as it seems an unreasonable amount of salt is eaten under the plea of a little salt being necessary.

GINGERBREAD.—2 cups of molasses and 1 of butter; 2 teaspoons of ginger, and 1 even full of bi-carbonate of soda; 1 tea-cup of warm water; flour enough to make a soft dough. After it is placed in the bake tin, flour your hands to pat it into shape, and with a knife cross-cut the top into squares or diamonds. Bake until done.

GINGERBREAD, SPICE.—Take 3 lbs. of flour, 1 lb. of butter, 1 lb. of moist sugar, 4 oz.

of candied orange or lemon peel, cut small; 1 oz. of powdered ginger, 2 oz. of powdered allspice, $\frac{1}{2}$ an oz. of powdered cinnamon, a handful of caraway seeds, and 3 lbs. of treacle; rub the butter with your hand into the flour, then add the other ingredients, and mix it in the dough with the treacle; make it into cakes or nuts, and bake it in a warm oven.

GINGER SNAPS.—1 pint of baking molasses, 1 lb. of sugar, $\frac{1}{4}$ lb. of lard, $\frac{1}{2}$ oz. of ginger, and 1 tablespoonful of cinnamon. Work the lard, molasses and sugar together, and add flour enough to make a stiff dough. Roll out thin, cut with a round cake-cutter, and bake quickly.

GINGER BISCUIT.—Rub $\frac{1}{2}$ a lb. of fresh butter into 2 lbs. of fine flour; add $\frac{1}{2}$ lb. of sifted sugar, and 3 oz. of pounded ginger. Beat up the yolks of 3 eggs, and take a little milk with which to make the above ingredients into a paste. Knead it all well together, and roll it out extremely thin, and cut it into the form of round biscuits with a paste-cutter. Bake them in a slow oven until crisp, taking care that they are a pale brown color.

GRAVY, BROWN.—3 onions, sliced and fried in butter to a nice brown; toast a large, thin slice of bread a considerable time until very hard and of a deep brown. Take these, with any piece of meat, bone, etc., and some herbs, and set them on the fire, with water according to judgment, and stew down until a thick gravy is produced. Season, strain, and keep cool.

GREEN-CORN CAKES.—Grate the corn, make a rich batter with cream, or according to directions given for batter cakes. Use just sufficient of the batter to hold the corn together, and lay the cakes on the griddle as you would a common griddle cake. Serve with butter.

GREEN-CORN PUDDING.—12 ears of corn, grated; 3 eggs, well beaten; 1 pint of sweet milk, $\frac{1}{2}$ a cupful of butter, 1 large spoonful of sugar, pepper and salt. Bake in a large pudding-pan 2 hours.

GREEN PEAS, To Stew.—Put into the stew-pan a quart of peas, a lettuce, and an onion sliced, butter, pepper, salt, but no more water than remains about the lettuce after washing. Stew 2 hours very gently. When to be served, beat up an egg and stir it into them, or a little flour and water.

***GRUEL, WATER.**—Take of the coarse part of corn meal or grist, 2 handsful; water, 3 quarts; boil it till only 2 quarts remain, then strain off the liquor, and season it to the palate with salt, sugar and nutmeg, to which may be added a spoonful or two of wine.—2. Take of oatmeal 2 large spoonfuls; water, 1 quart. Mix them well, and boil them about 10 or 15 minutes, stirring often; then strain the gruel through a sieve, and add sugar and salt enough to make it agreeable to the taste. When it is designed as a meal, dissolve in it a little butter, and then add bread and nutmeg, as occasion requires.

HADDOCK, To Fry.—Skin the fish, cover it with bread-crumbs and egg, seasoned with salt and pepper, and fry with boiling lard or butter.

HOTCH-POTCH.—(A favorite Scotch soup.) Boil a good-sized neck or breast of lamb for $\frac{1}{2}$ an hour; take out of the soup pot 6 of the best chops, and lay them aside; then boil the rest to a good stock. Wash and cut into small pieces 4

freshly pulled young turnips, 4 young carrots, 12 young onions, a good-sized lettuce, and a small bunch of parsley; boil all these in the stock 1 hour. 20 minutes before the soup is required, cut up a fresh cauliflower and put it in, together with a quart of green peas, a pint of young beans, and a little pepper and salt; heat the chops that have been laid aside, and pour the soup over them in the tureen. A sprig of mint is an improvement.

HOPS, To Choose.—When rubbed between the fingers, or on the palm of the hand, good hops will feel glutinous, have a fragrant smell, and develop a fine yellow dust. The seeds should be ripe, and the leaves full and unbroken, and of a fine brownish-yellow green. Avoid yearlings, unless you can get them in good condition, and $\frac{3}{4}$ the price of new hops.

ICE CREAM, STRAWBERRY.—Take 1 pint of strawberries, 1 pint of cream, nearly $\frac{1}{2}$ a lb. of powdered white sugar, and the juice of a lemon; mash the fruit through a sieve, and take out the seeds, mix with the other articles, and freeze; a little new milk added makes the whole freeze more quickly.

ICE CREAM, RASPBERRY.—The same as strawberry. These ices are often colored by cochineal, but the addition is not advantageous to the flavor. Strawberry or raspberry jam may be used instead of the fresh fruit, or equal quantities of jam and fruit employed. Of course the quantity of sugar must be proportionately diminished.

ICE, Lemon Water.—Lemon juice and water, each $\frac{1}{2}$ a pint; strong syrup, 1 pint; the rind of the lemon should be rasped off before squeezing with lump sugar, which is to be added to the juice; mix the whole; strain after standing an hour, and freeze. Beat up with a little sugar the whites of 2 or 3 eggs, and as the ice is beginning to set, work this in with the spatula, which will much improve the consistence and taste.

ITALIAN CREAM.—To a pint of rich milk add as much fine white sugar as will sweeten it, the rind of a large lemon pared thin, a small piece of cinnamon, and $\frac{3}{4}$ of an oz. of isinglass; put all these ingredients into a lined saucepan, and boil till the isinglass is perfectly dissolved; beat the yolks of 6 eggs very well in a large basin, and strain the milk while boiling hot to the eggs, stirring them rapidly all the time; continue to stir till the mixture is nearly cold; before putting it into the shape add a dessert spoonful of strained lemon juice; it will turn out in a few hours.

INDIAN-MEAL CAKES.—To 3 pints of Indian meal, a piece of butter as large as an egg, and a teaspoonful of salt. Put 2 tea-cupfuls of boiling water, stir it in, then add 3 eggs, and milk to make it to the consistency of batter.

INDIAN-MEAL PUDDING.—Into 1 quart of boiling milk stir 1 quart of sifted fine meal; then add 1 quart of cold milk, 2 well beaten eggs, $\frac{3}{4}$ of a cup of sugar, and 1 cup of flour. Stir well and pour it into a buttered dish. Bake 2 hours, and serve with butter.

INDIAN PONE.—Put 1 quart of water in a pot; as soon as it boils stir in as much Indian meal as will make a very thin batter. Beat it frequently while it is boiling, which will require 10 minutes; then take it off, pour it in a pan, and add 1 oz. of butter, and salt to taste. When

the batter is lukewarm, stir in as much Indian meal as will make it quite thick; set it away to rise in the evening; in the morning make it out in small cakes, butter your tins, and bake in a moderate oven. Or the more common way is to butter pans, fill them 3 parts full, and bake them. This cake requires no yeast.

***JELLY, Arrowroot.**—Put half a pint of water, a glass of sherry, a little grated nutmeg and fine sugar into a saucepan; and when boiling mix gradually with them a dessert-spoonful of arrowroot already rubbed smooth in a table-spoonful of cold water. Boil all together for 3 minutes, and pour into glasses or small cups. This jelly may be flavored with the juice of any fruit that is in season, or with orange or lemon juice.

***JELLY, APPLE.**—Slice whole apples—(cores, parings and all)—cook them with just water enough to cover them till reduced to a soft pulp. Take the rind and juice of 4 lemons; strain this pulp, (not squeezing much, or going over it twice;) slice the lemons, measure a pint for a lb. of white sugar; let it boil for half an hour, and turn into forms. Quince, etc., the same way.

***JELLY, CALVES' FEET.**—For each foot take 3 pints of water, and boil it to half that quantity; then let it cool, and skim off the fat. It must now be boiled for 2 or 3 minutes with the peel of a lemon and a little spice, when it should be removed from the fire, strained through a flannel bag, and the juice of a lemon and a glass of wine added; when cooled a little, it may be put into glasses or forms.

***JELLY, CHICKEN.**—Take 1 large fowl, put it into a saucepan with 2 quarts of water, 1 large onion, 1 blade of mace, and 1 teaspoonful of salt; boil all till reduced to 3 pints, then strain it, and let it stand till the next day; then take off the fat very clean, take the whites of 6 eggs, half an oz. of isinglass, the juice of 1 or 2 lemons, beat them well altogether, and boil it till the scum rises to the top. Let it stand a few minutes, then strain it through a jelly-bag. The above is a very strengthening preparation, and may be taken cold or hot, as best suits the patient's taste.

***JELLY, SAGO.**—Boil a teacupful of sago in 4 pints of water, till quite thick; when cold, add a pint of raspberry juice, pressed from fresh fruit, or half the quantity of raspberry syrup; add enough loaf sugar to sweeten it, boil it fast for 5 minutes, and put it into a shape which has been steeped in cold water; pour a little cream over the jelly in the dish.

JELLY ORANGE.—Squeeze the juice from 10 sweet and 1 Seville orange; add the juice of 2 and the rind of 1 lemon pared thin; loaf sugar enough to sweeten the juice, 1 quart of water, and 4 oz. of isinglass. Boil all these ingredients for a few minutes, and then strain through a jelly-bag till clear, and put it into shapes. Add a little saffron if the color is too pale.

LAMB, To Judge of its Quality.—If fresh, the vein in the neck of a fore-quarter is bluish; if green or yellow, stale. In the hind-quarter, if the knuckle is limp, and the part under the kidney smells slightly disagreeable, avoid it. If the eyes are sunken, do not buy the head.

LAMB, To Roast.—The hind quarter of lamb usually weighs from 7 to 10 lbs.; this size will take about 2 hours to roast it. Have a brisk

fire. It must be very frequently basted while roasting, and sprinkled with a little salt, and dredged all over with flour, about $\frac{1}{2}$ an hour before it is done.

LAMB, Leg of, To Boil.—It must be put into boiling water, then the saucepan (or deep fish-kettle with a drainer is best) drawn back, and the water allowed to simmer gently, reckoning 18 minutes to each lb.; if it boils fast, the meat will be hard and the skin broken. It should be lifted out of the water with the drainer, and no fork be stuck into it; if the scum has settled upon it, wash it off with some of the liquor before sending to table. Parsley and butter are served with this, or delicate caper sauce and young carrots.

LEMON CAKE.—Beat 6 eggs, the yolks and whites separately, till in a solid froth; add to the yolks the grated rind of a fine lemon and 6 oz. of sugar dried and sifted; beat this a $\frac{1}{4}$ of an hour; shake in with the left hand 6 oz. of dried flour; then add the whites of the eggs and the juice of the lemon; when these are well beaten in, put it immediately into tins, and bake it about an hour in a moderately hot oven.

LEMON PIE.—2 lemons; squeeze out the juice, and chop the lemons fine, (take out the seeds;) 3 cups of water, 3 cups of sugar, 1 egg, $\frac{1}{4}$ of a cup of flour; beat the egg well with a cup of water and the flour; then stir lemons, juice, and all together; this will be sufficient for 3 pies.

LEMON SAUCE.—Melt 2 oz. of butter in a little water; put in 2 oz. of sugar, the juice and grated rind of half a lemon, and the pulp and juice of the other half. Boil together 5 minutes, and serve hot for cold puddings.

*** LEMON WATER.**—Put 2 or 3 slices of lemon, with a lump of sugar and a spoonful of capillaire, into a covered jug, and pour into it a pint of boiling water. Cover it closely for 2 or 3 hours. It will thus form a very agreeable drink for a feverish patient.

MACKEREL, To Fry.—Divide the fish into pieces; remove the skin; dip them in beaten egg; strew on them chopped parsley and bread crumbs, and fry them. For sauce melt some butter with a little flour, put into it the roes of the fish, pounded; season with salt and Cayenne, and a little catsup, and pour it hot over the fish.

MACARONI, Boiled.—Soak and boil the macaroni in plenty of milk and water; throw in a little salt. Boil until tender, but not until the form is lost. When soft, turn into a baking dish, pour over the top the contents of a whisked egg, and bake until brown. This process renders it a more attractive dish than when simply boiled. Macaroni, with cream, sugar and cinnamon, makes a very nice, sweet dish.

MEAT, Test of Bad.—1. Good meat is neither of a pale pink color, nor of a deep purple tint; for the former is a sign of disease, and the latter indicates that the animal has not been duly slaughtered, but has died with the blood in it, or has suffered from acute disease.—2. It has the appearance of marble, from the ramifications of little veins of fat among the muscles.—3. It should be firm and elastic to the touch, and will scarcely moisten the fingers—bad meat being wet, sodden and flabby, with the fat looking like jelly, or wet parchment.—4. It should have little or no odor, and the odor should not be dis-

agreeable; for diseased meat has a sickly, cadaverous smell, and sometimes a smell of physic. This is very discoverable when the meat is cut up and drenched with warm water.—5. It must not shrink or waste much in cooking.—6. It should not run to water, or become very wet on standing for a day or so, but should, upon the contrary, dry upon the surface.—7. When dried at a temperature of 212°, or thereabouts, it will not lose more than from 70 to 74 per cent. of its weight, whereas bad meat will often lose as much as 80 per cent. Other properties of a more refined character will also serve for the recognition of bad meat—as that the juice of the flesh is alkaline or neutral to test paper, instead of being distinctly acid, and the muscular fibre, when examined under the microscope, is found to be sodden and ill-defined.

MEAT, Stewed.—Stewing is undoubtedly the most economical mode of cooking meat; by its use every part of the meat is retained, and nothing is lost or wasted. Joints, too tough or sinewy to be used in any other way, may be stewed with advantage. Stewing consists in subjecting meat for a considerable time to a very moderate heat in a small quantity of water. No good stew for an early dinner can be made the day it is wanted. The plan recommended is to cut the meat in pieces of the required size, pack them closely together, covering them with cold water, or what is preferable, broth; place the stew-pan where it will gradually warm, and keep it for some hours at a heat considerably short of boiling. The albumen is thus dissolved, and the fibres so far softened and separated that the very toughest parts become tender and digestible. The stew should be put away in an open vessel until the next day, when the fat should be removed from the top, and vegetables and seasoning added.

MEAT, Strasbourg Potted.—Take 3 lbs. of the rump of beef, cut into small bits, and put it in an earthen jar with a $\frac{1}{4}$ of a lb. of butter at the bottom; make a paste of flour and water; cover the jar closely, and set it in a pot of boiling water. In 2 hours take it out, and add 1 teaspoonful of allspice, the same of pepper, and 2 of salt; then boil another hour. Let it stand until cold; pound the meat with a pestle until it is entirely broken up; add to it the liquor in the pot, and 3 large tablespoonfuls of tomato catsup. Press into small pots and cover with melted butter. It will keep 2 or 3 months in a cold, dry place, and is a delicious relish for breakfast, tea or lunch.

*** MEAT PANADA.**—Take the inside of a loin of mutton or of part of a sirloin of beef; pound it until it will pass through a sieve when mixed with hot water or with broth, as it is required to be more or less rich. The most proper seasoning is a little salt. It ought to be kept in an earthen vessel in a cool place. When a little of it is required it should be warmed up and served with thin slices of bread.

MILK BISCUIT.—Take 1 lb. of flour, $\frac{1}{4}$ of a lb. of butter, 8 tablespoonfuls of yeast, and $\frac{1}{2}$ a pint of new milk. Melt the butter in the milk, put in the yeast and some salt, and work into a stiff paste. When light, knead it well, roll it out an inch thick, cut out with a tumbler, prick them with a fork, and bake in a quick oven.

*** MILK WHEY.**—Place a small piece of

rennet in a cup of hot water for 4 or 5 hours. Pour the water into 2 quarts of new milk, and when the curd appears, strain the whole through a hair sieve into a jug. The whey may be given to a patient either cool or lukewarm.

MOLASSES.—When molasses is used in cooking, it is a very great improvement to boil and skim it before you use it. It takes out the unpleasant raw taste, and makes it almost as good as sugar. Where molasses is used much for cooking, it is well to prepare 1 or 2 gallons in this way at a time.

MUFFINS.—1 pint of milk, 1 tablespoon of butter, 1 pint of flour, a small teaspoon of salt, 3 eggs, the whites and yolks beaten separately and very stiff; a small teaspoon even full of soda; add the whites last, beat smartly and perfectly free from lumps. Butter the griddle, and bake in well-buttered rings. When the bottom is done, turn over the rings and bake the top, or put the rings on a well-buttered bake-pan, and bake in a quick oven.

* **MULLED EGG.**—Beat the yolk of a fresh egg in a tea or coffee cup, put in a little milk or cream and sugar, and then pour into it as much tea or coffee as will fill the cup, taking care to stir it well at the same time to prevent the egg from curdling. This makes a good breakfast for an invalid. It is light and nourishing without being heating.

MUSHROOMS, To Distinguish from Poisonous Fungi.—1. Sprinkle a little salt on the spongy part or gills of the sample to be tried. If they turn yellow they are poisonous—if black they are wholesome. Allow the salt to act before you decide on the question.—2. False mushrooms have a warty cap, or else fragments of membrane, adhering to the upper surface; they are also heavy, and emerge from a vulva or bag; they grow in tufts or clusters in woods, on the stumps of trees, etc., whereas the true mushrooms grow in pastures.—3. False mushrooms have an astringent, styptic, and disagreeable taste.—4. When cut they turn blue.—5. They are moist on the surface, and generally,—6. Of a rose or orange color.—7. The gills of the true mushroom are of a pinky red, changing to a liver color.—8. The flesh is white.—9. The stem is white, solid and cylindrical.

MUSHROOMS, Broiled.—Mushroom-flaps, pepper and salt to taste, butter, lemon-juice. Cleanse the mushrooms by wiping with a piece of flannel and a little salt; cut off a portion of the stalk, and peel the tops; broil them over a clear fire, turning them once, and arrange them on a very hot dish. Put a small piece of butter on each mushroom, season with pepper and salt, and squeeze over them a few drops of lemon-juice. Place the dish before the fire, and when the butter is melted serve very hot and quickly. Moderate-sized flaps are better suited to this mode of cooking than the buttons; the latter are better in stews.

MUSHROOMS, To Stew.—Trim and rub clean with a bit of flannel dipped in salt, $\frac{1}{2}$ a pint of large button mushrooms; put into a stewpan 2 oz. of butter; shake it over the fire till thoroughly melted; put in the mushrooms, a teaspoonful of salt, half as much pepper, and a blade of mace pounded; stew till the mushrooms are tender, then serve them on a very hot dish.

MUSHROOM CATSUP.—Gather mush-

rooms in dry weather; take the large, fully-grown flaps, and see that they are free from insects and earth. Add to each peck of mushrooms $\frac{1}{2}$ a lb. of salt; break them up into a large earthenware pan, strew the salt over them, and let them stand for 3 days, stirring and mashing them up each day, then strain out all the juice. To every quart of juice put $\frac{1}{4}$ an oz. of whole black pepper, $\frac{1}{2}$ an oz. of bruised ginger, $\frac{1}{4}$ of an oz. of allspice, $\frac{1}{4}$ of an oz. of Cayenne, and the same quantity of pounded mace. Put all the spices with the juice into a large earthenware jar, (standing in a pot of water,) and boil for 3 hours; or the catsup may be boiled in a preserving pan. Let the spices remain in it when bottled.

MUSTARD, Superior Table.—Take of best flour of mustard, 2 lbs.; fresh parsley, $\frac{1}{2}$ oz.; chervil, $\frac{3}{4}$ oz.; celery, $\frac{3}{4}$ oz.; Tarragon, $\frac{3}{4}$ oz.; garlic, 1 clove; and 12 salt anchovies, (all well chopped;) grind well together; add of salt 1 oz., and sufficient grape juice or sugar to sweeten, with sufficient water to form the mass into a thinnish paste by trituration in a mortar. When put into pots, a red-hot poker is to be thrust into each, and a little vinegar afterwards poured upon the surface.

MUSTARD, FRENCH.—Salt, $1\frac{1}{4}$ lbs.; scraped horse-radish, 1 lb.; garlic, 2 cloves boiling vinegar, 2 gallons; macerate in a covered vessel for 24 hours; strain, and add sufficient flour of mustard.

MUTTON, To Judge its Quality.—The meat should be firm and close in grain, and red in color; the fat white and firm. Mutton is in its prime when the sheep is about 5 years old, though it is often killed much younger. If too young, the flesh feels tender when pinched; if too old, on being pinched it wrinkles up, and so remains. In young mutton, the fat readily separates; in old, it is held together by strings of skin. In sheep diseased of the rot, the flesh is very pale-colored, the fat inclining to yellow; the meat appears loose from the bone, and, if squeezed, drops of water ooze out from the grains; after cooking, the meat drops clean away from the bones. Wether mutton is preferred to that of the ewe; it may be known by the lump of fat on the inside of the thigh.

MUTTON, To Roast a Saddle of.—Take lean ham, truffles, green onions, parsley, thyme, and sweet herbs, all chopped small, with some spice, pepper and salt. Strew them over the mutton when the skin is taken off, put the skin over it neatly, and before roasting tie over it white paper well buttered. When the meat is nearly done take off the paper, in order that the surface of the meat may be nicely browned.

MUTTON, Stewed Leg of.—Put it into the stew-pan with either broth or water, 2 or 3 carrots, a turnip, an onion, and a few black peppercorns. After coming to a boil, simmer for $2\frac{1}{4}$ hours, take out the broth and vegetables, dredge the meat with flour, and put it again on the fire to brown, leaving off the cover. Pulp the vegetables through a sieve, and boil them up with the gravy, adding a tablespoonful of vinegar. Pour part of the sauce on the meat and send the rest to table in a tureen.

* **MUTTON BROTH.**—2 lbs. of a neck of mutton, a large handful of chervil; put these into 2 quarts of water and boil down to 1 quart. All of the fat should be removed. A pint may

be taken 2 or 3 times a day. It affords excellent nutriment to the weak.

NUTMEGS, To Select.—Prick them with a pin. If they are good the oil will instantly spread around the puncture.

OYSTERS—Are They Healthy?—Open an oyster, retain the liquor in the lower or deep shell, and, if viewed through a microscope, it will be found to contain multitudes of small oysters, covered with shells and swimming nimbly about—120 of which extend but 1 inch. Besides these young oysters, the liquor contains a variety of animalculæ, and myriads of 3 distinct species of worms. Sometimes their light represents a bluish star about the centre of the shell, which will be beautifully luminous in a dark room.

OYSTER STEW.—Stew the oysters in their own liquor, and season to the taste with a little salt and pepper; butter may be added. Stews are often improved, in the opinion of many, by the addition of milk or cream, and condiments in the way of mace, parsley or nutmeg. If thickening of the soup is desired, grated cracker is preferable to flour. The best cooks omit flour entirely. A piece of butter rolled in grated cracker may be added. Pour the oysters, when done, over a dish floored with crackers, or covered with layers of crispy toasted bread.

OYSTERS, To Fry.—After they are taken from the shell, dry them on a clean cloth or napkin. Beat up the yolks of eggs with thick, sweet cream—1 yolk to 2 tablespoons of cream. Rub together some grated bread crumbs or cracker, and a little salt and pepper. Have hot in a skillet $\frac{3}{4}$ of a lb. of melted butter. Dip each oyster in the beaten yolk and cream, and then roll it in the crumbs, coaxing them to adhere to it. Drop into the skillet, and fry until of a light brown color on both sides. They ought to be crisp and light. Never pour over them the melted grease that may remain.

OYSTERS, To Bake, Roast or Boil.—But a few minutes are required for this. Wash the shells clean. To roast, lay the shells on a gridiron, over a bed of live coals. When the shells open they are done. Lift off the top, and serve in the under shell. To bake them, put in a pan in hot oven; otherwise follow the same directions as for roasting. To boil, put them in a pot of boiling water. Serve in the shell.

OYSTER SOUP.—To each dozen or dish of oysters put half a pint of water; milk 1 gill; butter half an oz.; powdered crackers to thicken. Bring the oysters and water to a boil, then add the other ingredients previously mixed together, and boil from 3 to 5 minutes only.

OYSTER PATTIES.—Take of oysters sufficient for the patties you may chance to want, strain the liquor and return it to them; mix them with very fine bread crumbs until they are of a proper thickness; add a little scalded cream, and season the whole with pepper, salt, and cayenne pepper; warm the whole in a saucepan till it begins to simmer; when cold, put it in the paste, and bake it in the shape of small mince pies, 3 inches in diameter. The beards and horny part should be cut off, and the oysters cut in 2 or 3 pieces.

OYSTERS, ARTIFICIAL.—Take young green corn, and grate it in a dish; to 1 pint of this add 1 egg well beaten, a small teacup of

flour, $\frac{1}{2}$ a cup of butter, some salt and pepper, and mix them well together. A tablespoonful of the batter will make the size of an oyster. Fry them a light brown, and when done butter them. Cream, if it can be procured, is better than butter.

OAT CAKES, SCOTCH.—Put 3 handfuls of best Scotch catmeal into a basin, with a bit of butter the size of a nutmeg; add as much cold water as will form it into a cake. Press the cake out with the hands until it is thin, then roll with the rolling pin till it is almost as thin as a silver dollar. Have the griddle already heated, sift a little meal over it, and lay on the cake. When the under side is brown, toast the upper side in a toaster before the fire to make it crisp. These cakes should be kept in the meal chest among the dry meal to preserve their crispness, which is their peculiarity. They are extremely nice to eat with cheese.

OMELETTE.—Beat separately the yolks and whites of 4 fresh eggs; to the yolks add as much powdered white sugar as will sweeten it, and a small dessert-spoonful of corn flour, very smoothly blended in a spoonful of cream or good milk. Beat the whites to a stiff froth, add the flour to the yolks, and gently stir in the whites, taking care to break the froth as little as possible; pour the whole into a clean frying-pan from which the butter has been drained; 2 or 3 minutes over a clear fire is enough to cook the under side; hold the pan to the fire till the upper side looks firm; spread raspberry or strawberry jam over one half, turn the other side over it, and serve immediately.

ONIONS, BOILED.—Take the outside skin from white onions as uniform in size as possible, lay them in cold salt and water for 1 hour, and then boil them in milk and water until thoroughly tender; lay them in a deep dish, and pour over them melted butter.

ONIONS, ROASTED.—These should be cooked in their skins; but before putting them into the oven brush off all grittiness. Place in a moderate oven, cooking gradually until nearly done; then quicken the oven and brown. Serve with plenty of fresh butter.

PÂTÉ for Fruit or Meat Pies.—This paste may be made with $\frac{3}{4}$ of wheat flour, $\frac{1}{4}$ of the flour of boiled potatoes, and some butter or dripping; the whole being brought to a consistence with warm water, and a small quantity of yeast added when lightness is desired.

PARTRIDGES, To Roast.—Rightly to look well there should be a leash (3 birds) in the dish; pluck, singe, draw and truss them; roast them for about 20 minutes; baste them with butter, and when the gravy begins to run from them you may safely assume that the partridges are done; place them in a dish, together with bread crumbs, fried nicely brown and arranged in small heaps. Gravy should be served in a tureen apart.

PARTRIDGES, To Broil.—Cut them in half, dip them in a butter previously melted, and cover them thickly with crumbs of bread. A $\frac{1}{4}$ of an hour ought to be sufficient to cook them over a clear fire.

PARTRIDGE PIE.—2 braces of partridges are required to make a handsome pie. Truss them as for boiling; pound in a mortar the livers of the birds, a $\frac{1}{4}$ of a lb. of fat bacon, and some shred parsley; lay part of this forcemeat

at the bottom of a raised crust; put in the partridges, add the remainder of the forcemeat and a few mushrooms; put some slices of bacon fat on the top, cover with a lid of crust, and bake it for $2\frac{1}{2}$ hours. Before serving the pie remove the lid, take out the bacon, and add sufficient rich gravy and orange juice. Partridge pie may also be made in a dish in the ordinary way.

PASTE, Rich and Light.—To 1 lb. of flour, dried and sifted, take $\frac{1}{2}$ a lb. of good fresh butter and $\frac{1}{2}$ a lb. of lard; divide the flour into 2 equal portions; put $\frac{1}{2}$ on the paste-board; cut the butter (from which the water should be squeezed) into slices about $\frac{1}{2}$ an inch thick; do the same with the lard; cover the slices with flour, roll them out thin with the rolling-pin and lay them aside; put the other $\frac{1}{2}$ of the flour into a basin, work into it with a spoon a $\frac{1}{4}$ of a pint of water, or enough to make the flour into a stiff dough—too wet a dough will make tough paste—lay this upon the paste-board, and roll it out till it is $\frac{1}{2}$ an inch thick, then lay the fourth part of the butter and lard all over it, fold it up and roll it again; put on another fourth of the butter, and repeat the buttering and rolling till all the rolled butter is mixed in. Then cover the tart, and bake it in a brisk oven. Always handle pastry as lightly as possible, particularly after the butter has been put in.

PASTE, POTATO.—A $\frac{1}{4}$ of a lb. of cold boiled potatoes to $\frac{1}{2}$ a lb. of flour, rubbed well together, wet with very little water, and add 6 oz. of good lard or butter. For a sweet paste, add a tablespoonful of powdered sugar; for a meat paste the same quantity of salt.

PARSNIPS, To Boil. Wash the parsnips, scrape, boil tender, and then slice and brown on a griddle, with butter to prevent sticking. Carrots are good, cooked in the same way.

PANADA, BREAD.—Soak a few thin slices of stale, light, and well-baked bread in hot water, so as to form a pulp of suitable consistence. Simmer it gently, with some little addition of water from time to time as it thickens; then add 2 or 3 tablespoonfuls of warm milk, a little loaf sugar, and a few grains of salt. The objection to this bread-pap, as commonly used, is that nurses are sometimes apt to make it too thick.

PANADA, CHICKEN.—Skin a fowl; cut it in pieces, leaving the breast whole; boil it in 3 pints of water till perfectly tender, pick off the meat, and pound it finely in a mortar, and mix it with the liquor it was boiled in; rub it through a sieve, and season it with salt.

PEARS, To Bake.—Take ripe pears and wipe them carefully; place a layer stem upward in a stone jar; sprinkle over sugar; then set in another layer of pears, and so on till the jar is filled. To every gallon put in $1\frac{1}{2}$ pints of water. Cover the top of the jar with pie crust, and set in a slow oven for 2 hours.

PEACHES, To Peel.—In peeling small peaches with a knife, too much of the peach is wasted; but by having a wire cage similar to those made for popping corn this waste is obviated. Fill the cage with peaches, and dip it into boiling water for a moment, then into cold water for a moment, and empty out—going on in the same way for all you wish to peel. This toughens the skin and enables you to strip it off, saving much in labor, as also the waste of the peach.

PEAS, To Stew.—Take a quart of shelled peas, a large onion, or two of middling size, and 2 lettuces cut small; put them into a saucepan with $\frac{1}{2}$ a pint of water; season them with a little salt, a little pepper, mace and nutmeg. Cover them close, and let them stew a $\frac{1}{4}$ of an hour; then put in a $\frac{1}{4}$ of a lb. of fresh butter rolled in a little flour, a spoonful of catsup, and a small piece of butter as big as a nutmeg; cover them close, and simmer gently an hour, often shaking the pan.

PIE, CREAM.—For 1 pie, take 2 eggs, $\frac{1}{2}$ cup of sugar, 3 tablespoonfuls of flour, 1 pint of sweet milk; heat your milk; beat sugar, eggs and flour together; add to the scalded milk, and cook to a thick custard; flavor with lemons; bake your crust, and when cold fill with the custard.

PIE, LEMON.—Grate $\frac{1}{2}$ of the outside of a lemon, and squeeze out the juice; yolks of 2 eggs; 2 tablespoonfuls, heaped, of sugar; $\frac{1}{2}$ cup of water; 1 teaspoonful of butter; stir well, and bake in a deep dish lined with crust. Beat the whites of the eggs to a stiff froth; stir in 2 tablespoonfuls of pulverized sugar, and spread over the top of the pie, as soon as it is baked. Set in the oven till the top is nice browned.

PIE, MINCE.—Take of boiled beef, chopped fine and salted, 1 pint; apples, chopped fine, 1 quart; butter or suet, 1 teacupful; 1 teacup sugar, 1 pint each of boiled cider and water. Stew all together until the apples are done, and when cold add 1 pint of canned or stewed raspberries or blackberries, 1 teaspoonful of pepper, 1 of cloves, 2 of cinnamon, and 2 of allspice.

PIE, ORANGE.—Take the juice and pulp of 6 large, sour oranges, and the grated rind of 4, a little salt, 3 cupfuls of sugar, 3 eggs, 4 cupfuls of water, 6 spoonfuls of rice flour. Mix these ingredients well together, make a good crust, and bake like other pies.

PIE, PEACH.—Take good ripe peaches, halve and stone them; make a good short crust, and lay it in your pie-plates. Lay your peaches evenly to cover it; then add to each moderate-sized pie about 3 spoonfuls of white sugar, and a few drops of essence of lemon or rose, and $\frac{1}{2}$ a teacupful of water; cover, and bake like other pies.

PIE, PUMPKIN.—Choose the best pumpkins that can be found. Take out the seeds, cut the rind carefully away, and then cut the pumpkin into thin and narrow bits. Stew over a moderate fire in a little water—just enough to keep the mass from burning—until soft. Turn off the water, if any remains, and let the pumpkin steam over a slow fire about 10 minutes. When sufficiently cooled, strain through a sieve. Sweeten the pumpkin with sugar and a little molasses. The sugar and eggs should be beaten together. The flavoring requires ginger, the grated rind of a lemon or nutmeg, and salt. To 1 quart of pumpkin add 1 quart of milk and 4 eggs for ordinary richness.

Heat the pumpkin scalding hot before putting it upon the crust to bake, otherwise the crust will be scalded. Bake in a very hot oven.

PIGEONS.—Pigeons are very indifferent food when they are too long kept. Suppleness of the feet show them to be young; the state of the flesh is flaccid when they are getting bad from keeping. Tame pigeons are larger than the wild.

PIGEONS, Stewed.—Make a seasoning of pepper, salt, cloves, mace, sweet herbs, and a piece of butter rolled in flour, and put it into them, closing the opening. Half roast them; then stew them in good gravy, with whole pepper, mace, lemon, sweet herbs, and a small onion. Take them out when done, strain the liquor, skim it, and thicken it with a piece of butter rolled in flour; then put in the pigeons with some pickled mushrooms, and stew them for 5 minutes. Pour the sauce over them in the dish.

PORK AS FOOD.—Is the prohibition of pork to the Jews, as unclean food, founded on intrinsic unhealthfulness of the food itself? An article in one of our prominent monthlies expresses the opinion that it is, and gives a most disgusting picture of the diseased constitution of the hog. It says that "Vermont, New Hampshire, Maine, and other New England States, where the inhabitants send their beef cattle to Boston market, and live principally on pork as meat the year round, myriads of them are afflicted with scrofula, salt-rheum, tetter, ring-worm, 'humors in the blood,' consumption, etc. In the Far West pork is the principal meat consumed by the farmers and laboring classes; ham for breakfast, roast pig for dinner, and sausage for supper, and 'hog all the time!' And what is the effect of this unclean diet upon their constitution, health, etc.? Look at many of their wretched wives and children, with their rheumy eyes and enlarged glands, sore ears, etc., for an answer. While the Western farmer works in his fields in the open air, he is comparatively exempt from its baneful influence, and it is chiefly upon the health of his wife and children that its terrible effects may be seen. The late Doctor Beasland, of Chicago, told the author a few years since that it was estimated, by competent medical authority, that nearly $\frac{1}{4}$ of the entire population of the State were afflicted with scrofulous sore eyes, with enlargement of the glands at the edges of the lids, etc. This form of chronic ophthalmia is very common throughout the entire West." Do not raise or eat pork, or have, in the remotest way, anything to do with the disease-engendering, body-corrupting, health-destroying, unclean thing.

POTATOES, To Boil.—Put them into a steamer with scarcely sufficient water to cover them. Directly the skins begin to break, lift them from the fire, and as rapidly as possible pour off every drop of the water. Then place a coarse (we need not say clean) towel over them, and return them to the fire again until they are thoroughly done, and quite dry.

POTATOES, To Fry.—To fry raw potatoes properly, they should be pared, cut lengthwise into slices an eighth of an inch in thickness, dropped into a pan over the fire containing hot beef drippings, turned frequently, nicely browned all over, but never burned.

POTATO SCONES.—Mash boiled potatoes till they are quite smooth, adding a little salt; then knead out with flour, or barley-meal, to the thickness required; toast on the griddle, pricking with a fork to prevent them blistering.

POTATOES, MASHED.—Potatoes for mashing should be as nicely boiled as if they were intended to be eaten without further preparation; only they should be dressed a little more, though care should be taken not to let the

water get into them. The farinaceous part must be pounded up, with a small quantity of the freshest butter, the yolk of an egg well beaten, and a little pepper and salt; add, if possible, a little cream, and put the mashed potatoes into the oven to brown them.

POTATO SNOW.—Pick out the whitest potatoes, and put them on in cold water; when they begin to crack, strain and put them in a clean stewpan before the fire till they are quite dry, and fall to pieces; rub them through a wire sieve on the dish they are to be sent up in, and do not disturb them afterwards.

*** PUDDING, Arrowroot.**—Mix a tablespoonful in cold milk, and pour it into boiling milk. When cool, add the yolk of an egg well beaten and a little sugar; put it into a basin, and boil 10 minutes.

PUDDING, BIRD'S-NEST.—Peel tart apples, take out the cores, leaving the apples whole. Make a custard of 8 well beaten eggs, $\frac{1}{2}$ a pint of cream, and $1\frac{1}{2}$ pints of scalded milk, thickened with a heaping tablespoonful of flour and a little salt, but no sugar. Bake 20 minutes. When the apples are tender the pudding is done. Serve immediately with butter and sugar stirred to a cream.

PUDDING, HALF-PAY.— $\frac{1}{4}$ of a lb. of suet, $\frac{1}{4}$ of a lb. of currants, $\frac{1}{4}$ of a lb. of raisins, $\frac{1}{4}$ of a lb. of flour, $\frac{1}{4}$ of a lb. of bread crumbs, 2 tablespoonfuls of molasses, $\frac{1}{2}$ a pint of milk. Chop the suet finely; mix with it the currants, (which should be nicely washed and dried,) the raisins, (which should be stoned,) the flour, bread crumbs and molasses; moisten with the milk, beat up the ingredients until all are thoroughly mixed, put them into a buttered basin, and boil the pudding for $3\frac{1}{2}$ hours.

PUDDING, Rice and Apple.—Pick over and wash a teacupful of the best rice. Steam it until tender in 2 cups of cold water; spread it over a quart or 3 pints of good ripe apples, quartered; pour over 1 or 2 cups of milk, if preferred, or omit the milk and add a little water to the apples. Half a cup of white sugar may be sprinkled over the apples, or sugar may be added at the table, if preferred.

PUDDING, PLUM.—4 eggs, 12 crackers, 1 pint of new milk, 1 teacup of butter, half a lb. of sugar, 1 lb. of raisins, 1 lb. of prunes, with a finely grated nutmeg. Bake about an hour.

PUDDING, Potato.—1 lb. of potatoes, boiled half a lb. of fresh butter, half a lb. of sugar, the yolks of 6 eggs and the whites of 3, 1 gill of cream, 1 teaspoonful of mace, and 1 nutmeg. Bake in puff-paste.

PUDDING, RICE.—Half a pint of rice, 1 quart of milk, $\frac{1}{4}$ of a pint of sugar, nutmeg or cinnamon. Bake it slowly 2 hours. Tapioca may be cooked in the same way, after soaking in warm milk for an hour or two; and sago, after thoroughly washing and soaking over night, is good in the same fashion. It is possible to dilute the milk one-half and yet have the pudding good, if care is exercised in soaking and cooking.

RABBITS.—Rabbits, when old, have the haunches thick, the ears dry and tough, and the claws blunt and ragged. A young hare has claws smooth and sharp, ears that easily tear, and a narrow cleft in the cheek.

RABBITS, To Cook.—After skinning they

are thoroughly freed from blood with cold water. They are left over night in weak salt water, which is poured off in the morning, and new salt water added, in which they stand until ready for cooking. This water is made just sufficiently salt to fit the flesh for eating. They are then boiled until tender, when the meat is taken out, and flour and butter, first rubbed together, is stirred in and well peppered, and the whole poured over toast, upon which the meat is laid. A few sprigs of parsley added improve the taste for many persons.

SAUCE, SHIRLEY.—12 good-sized, ripe tomatoes; 2 bell peppers (large ones;) 2 onions (many omit these, and like the sauce better—consult your own taste.) Scald and skin the tomatoes; chop the peppers and onions (if used) very fine. Then add 1 cup of vinegar and $\frac{1}{4}$ of a cup of sugar, and boil 2 hours; then put in another cup of vinegar and boil 1 hour—or until the mixture does not separate. Then stir in 1 teaspoonful of cloves, 1 dessert-spoonful of cinnamon, and a teaspoonful of pimento (allspice.)

SAUCE, WORCESTERSHIRE.—All the English sauces in popular use are founded upon walnut catsup—that is of English walnuts—or upon mushroom catsup. To make a catsup of walnuts, the green shells are taken in these proportions: 2 gals. walnut juice, 5 lbs. salt, mixed and bruised, and allowed to lie a week; the liquor is then pressed out, and to every gallon is added 4 oz. of allspice, 3 oz. of ginger, and of pepper and cloves 2 oz. each, all bruised. The whole is then simmered for 30 minutes, and is then set aside to clear. This is the catsup. To make a sauce of this similar to Worcestershire, take 1 gal. port wine, $\frac{3}{4}$ gal. catsup, 2 lbs. anchovies, with their liquor, 8 lemons, 48 shallots or small onions, scraped horse-radish $1\frac{3}{4}$ lbs., mace 1 oz., Cayenne 2 oz., mustard 8 oz. Boil the whole gently, and then strain and bottle.

SAUCE, CHUTNEY.—Pare and core sour apples. Then take of these apples, tomatoes, brown sugar, and best raisins, each 8 oz.; salt, 4 oz.; red peppers (chilies) and powdered ginger, 2 oz. each; garlic and small onions, 1 oz. each. Pound the whole well, and add 3 quarts of best cider or wine vinegar—or vinegar made from beer—and 1 quart of lemon juice. Let it stand in the vessel a month, but give it a good shake daily. Then pour off the clear liquid and bottle it. The residue may be used in aid of a second batch of sauce, or, rubbed up into a very smooth paste, may form a constituent of French mustard.

* **SHANK JELLY.**—Scour and brush very clean 12 shanks of mutton, after soaking them in water for 4 hours. Simmer them gently for 5 hours in 3 quarts of water, putting with them 3 blades of mace, 2 onions, 20 Jamaica and 30 black peppercorns, some sweet herbs, and a crust of bread toasted brown; then strain off the liquor and keep it in a cool place. This is well adapted to delicate and debilitated persons.

SNIPES, ROASTED.—Do not draw them, but spit on a bird-spit; flour and baste well with butter; prepare a slice of toasted bread, lay it in a plate under the birds; roast for about 30 minutes; place them on the toast; butter, garnish with slices of lemon and parsley, and serve.

SOUP, Stock for.—4 lbs. of shin-bone, and

1 lb. of lean neck of beef, 4 carrots, 1 turnip, 1 stick of celery, 2 parsnips, 2 leeks, 1 onion, 6 cloves, 6 peppers, a bunch of sweet herbs, 1 gal. of water. Cut the meat into slices, crack the bone, and put it into an earthen pipkin that will stand the fire, as this makes far better soup than a metal saucepan; add the water, and let it stew slowly till the scum rises, and skim it clear; stick the cloves into the onion and then add the vegetables, and let the whole stew slowly till the meat is in rags, which will be in about 8 hours. It must simmer very slowly, for if it boils the meat will not yield the gravy so well, and the stock will be thick in place of being clear. After it is cold it should be strained through a cullender, and kept in a covered pan or jar for use.

SOUP, Coloring for.—As soups often require coloring, it is well to prepare browning for that purpose. 2 baked onions, well browned in the oven and then chopped fine, make an excellent coloring and flavoring. The shells of green peas, dried in the oven until they are brown, but not black, will also answer to brown soup, and will keep all winter if hung in a perfectly dry place.

SOUP, Prof. Boyd's.—Take the shank of beef, or pieces of beef or veal left from a roasting piece, and boil in water sufficient for the soup; if the meat has not been previously cooked, it must be boiled 4 or 5 hours, or till it will separate from the bone easily. Pare potatoes, 3 or 4 good sized onions, part of a yellow turnip, and 2 or 3 carrots, if desired; slice, not very thin, and boil in the soup after seasoning with salt and pepper to the taste. Boil the turnips about $1\frac{1}{2}$ hours; the other vegetables will cook sooner.

SOUP, Vegetable.—Peel and slice 6 large onions, 6 potatoes, 6 carrots, and 4 turnips; fry them in $\frac{1}{2}$ a lb. of butter, and pour on them 4 quarts of boiling water. Toast a crust of bread as brown and hard as possible—but do not burn it—and put it in, with some celery, sweet herbs, white pepper and salt. Stew it all gently for 4 hours, and then strain it through a coarse cloth. Have ready thinly sliced carrot, celery and a little turnip. Add them to your liking, and stew them tender in the soup. If approved of, a spoonful of tomato catsup may be added.

SOUP, Gumbo.—Fry a light brown 2 lbs. of the round of beef with 4 sliced onions; put into the soup pot with 4 quarts of water, $\frac{3}{4}$ a can of tomatoes or 12 fresh ones, 1 teacupful of sliced okra and 1 green pepper; boil slowly 5 hours and put through the cullender. Throw into theureen some sippets of fried bread and serve at once.

SODA CAKES.—Mix a teaspoonful of soda and 1 of tartaric acid with $\frac{1}{2}$ a teaspoonful of salt; melt 5 oz. of butter in a large cupful of milk; add these ingredients to 1 lb. of flour, $\frac{1}{2}$ a lb. of moist sugar, and 2 oz. of caraway seeds. Work into a soft dough, and, if not wet enough, add more milk; put into mince-pie pans to bake.

SPONGE-CAKE.—Beat 12 eggs as light as possible, (for sponge and almond cake they require more beating than for anything else;) beat 1 lb. of loaf sugar, powdered and sifted by degrees, into the eggs, continuing to beat some time very hard after all the sugar is in, (none but loaf sugar will make light sponge-cake.)

Stir in gradually a teaspoonful of powdered, mixed cinnamon and mace, a grated nutmeg, and 12 drops of lemon essence; lastly, by degrees, put in 10 oz. of sifted flour, dried near the fire, stirring round the mixture very slowly with a knife. If the flour is stirred too hard the cake will be tough. It must be done gently and lightly, so that the top of the mixture will be covered with bubbles. As soon as the flour is all in begin to bake, as setting will hurt it. Put it in small tins, well buttered, or in 1 large tin pan. The thinner the pans the better the sponge-cake. Fill the small tins about half full. Grate loaf sugar over the top of each before setting it in the oven.

SUGAR, To Clarify.—Take a little gum Arabic and a little isinglass dissolved in hot water; pour it, when dissolved, into your sugar when boiling, and it will clear all the sediment to the top of the pan, which you must skim off as often as it rises. Loaf sugar may be cleared with the white of an egg, isinglass or gum Arabic. A little of either will suffice.

SUET DUMPLINGS.—To 1 quart of flour add half a lb. of beef suet broken in very small pieces, 1 cupful of peach marmalade, a little salt, 1 teaspoonful of soda. Knead it with butter-milk, and make the dough out into dumplings larger than biscuit, and boil them till done. Serve up while hot with a rich sauce.

SUMMER SQUASH, To Cook.—Take them before the seeds begin to harden, wash or wipe them clean, remove the stem and cut in pieces; boil till quite soft; pour off all the water you can; mash as fine as possible, after which put it into a clean cloth or bag, and squeeze out the rest of the water. Turn out into a dish, and season with salt, butter, or thick, sweet cream, and pepper, to your taste.

TAFEE.—Put into a pan, or some shallow vessel, a $\frac{1}{4}$ of a lb. of butter and 1 lb. of brown sugar; set it upon the stove, and stir together for 15 minutes, or until a little of the mixture dropped into a basin of water will break clean between the teeth without sticking to them. Any flavoring that is desired—as lemon, pineapple, or vanilla—should be added just before the cooking is completed. The taffee, when done, should be poured into a shallow dish, which is buttered on the bottom and edges. By drawing a knife across it when partially cool, it can easily be broken into squares. Molasses may be used instead of sugar, but it is not so brittle.

***TAPIOCA PUDDING.**—4 large tablespoonfuls of tapioca soaked over night in 1 quart of new milk; grated rind of 1 lemon; 1 tumbler of sweet milk; one-half of a tumbler of wine, with sugar enough in it to fill the glass. Stir the tapioca and milk over the fire until it comes to a boil, before adding any of the other ingredients; 4 eggs, beaten separately, and added just before baking; it bakes in about 5 minutes. To be eaten cold.

TEA, How to Make.—The best way to make tea is by pouring a little boiling water on the leaves, and after they have become thoroughly saturated, which requires 1 to 2 minutes, by pouring it off again. This water contains most of the tannic acid, and the acrid and disagreeable principles of the tea, without depriving it of its flavor or strength. Now pour sufficient hot water over the leaves, and let them infuse for 10

or 15 minutes, when the beverage will be ready for use. This scalding with hot water is quite necessary with inferior tea, in which case boiling the leaves must especially be avoided.

TEA, Healthy Substitutes for.—The first leaves of the currant bush dried on tin cannot be known from green tea. Good meadow hay—fourth ounce to each person—infused in boiling water, is an aromatic, anti-bilious, nourishing and soothing narcotic to the nerves at all times; it promotes digestion and creates appetite. The unfolded petals of the red rose, dried, 5 parts; rosemary leaves, 1 part, and balm leaves, 2 parts, mixed, is also excellent. This far excels any imported tea, and sells at 75 cents per lb., and 1 lb. will last as long as 2 lbs. of common tea. The young leaves of the pea plant, or the young leaves and flowers of the common strawberry, dried in the air out of the sun, furnish delectable draughts when infused and taken with cream and sugar like tea.

TEA-KETTLES, To Prevent the Formation of Rust in.—Keep an oyster-shell in your tea-kettle. By attracting the stony particles to itself, it will prevent the formation of a crust.

***TEA, BEEF.**—Take 1 $\frac{1}{2}$ lbs. of the best steak; cut it into very small pieces, and put them into an earthenware jar, with enough cold water to cover the meat; tie the top of the jar on, and put it into a saucepan full of hot water; place the saucepan on the fire, and allow it to boil for 3 hours, by which time all the goodness of the meat will be extracted. This is the pure essence of beef.

***TOAST-WATER.**—Cut a slice off a stale loaf, about twice as thick as toast is usually cut. Toast it carefully until it is deep brown all over, but not blackened or burnt; lay it in the bottom of a jug with a thin slice of lemon-peel; fill the jug with boiling water, and let it stand till cold.

TOMATOES, BROWNE.—Take large, round tomatoes and halve them; place them, the skin side down, in a frying-pan in which a very small quantity of butter has been previously melted; sprinkle them with salt and pepper and dredge them well with flour; place the pan on a hot part of the fire, and let them brown thoroughly; then stir them and let them brown again, and so on until they are quite done. They lose their acidity, and the flavor is superior to stewed tomatoes.

TOMATO CATSUP.—Scald ripe tomatoes, and remove the skin. Let them stand a day, covered with salt; strain thoroughly to remove the seeds. To every 2 quarts of the liquor add 3 oz. of cloves, 2 of black pepper, 2 grated nutmegs, a little Cayenne pepper, and salt. Boil all together for $\frac{1}{2}$ an hour, then let the mixture cool and settle; add a pint of the best cider vinegar; bottle, cork tightly, and seal. Keep in a cool place.

TOMATO FRITTERS.—Take 1 quart of stewed tomatoes; stir in 1 egg, 1 small teaspoonful of saleratus or soda, and flour enough to make it of the consistency of pancakes.

TOMATO MARMALADE.—Take fine and ripe tomatoes, cut them in halves, and squeeze out the juice. Put them in a preserving pan, with a few peach-leaves, a clove of garlic, some slices of onion or shallot, and a bundle of parsley. Stew them until they are sufficiently done, pulp them through a sieve, and boil them down like other marmalade, adding salt. Put them

into small jars, pepper the tops, and pour clarified butter over. Eat it with fish, etc., or stir the contents of a small pot into the gravy of stews or fricassees.

TOMATO PUDDING.—Pour boiling water on tomatoes, remove the skins, put in the bottom of the pudding-dish some bread crumbs, then slice the tomatoes on them, season with sugar, butter, pepper, and salt; add some more bread crumbs, then the sliced tomatoes and seasoning, and if the tomato does not wet the bread crumbs add a little water; then, for a small pudding, beat up 2 eggs and pour over the top. Bake about 20 minutes.

TOMATO SOUP.—Wash, scrape, and cut small the red part of 3 large carrots, 3 heads of celery, 4 large onions, and 2 large turnips; put them into a saucepan, with a tablespoonful of butter and $\frac{1}{2}$ a lb. of lean new ham; let them stew very gently for an hour; then add 3 quarts of brown gravy soup and some whole black pepper, with 8 or 10 ripe tomatoes; let it boil an hour and a half, and pulp it through a sieve; serve it with fried bread cut in dice.

TURKEY, To Choose.—In choosing a turkey, the age of the bird is the chief point to be attended to. An old turkey has rough and reddish legs; a young one smooth and black. Fresh killed, the eyes are full and clear, and the feet moist. When it has been kept too long, the parts about the vent begin to wear a greenish, discolored appearance.

TURKEY, Stuffing for.—Take some bread crumbs and turn on just enough hot water to soften them; put in a piece of butter, not melted, the size of a hen's egg, and a spoonful of pulverized sage, a teaspoonful of ground pepper, and a teaspoonful of salt; there may be some of the bread crumbs that need to be chopped; then mix thoroughly and stuff your turkey.

TURKEY, To Bake.—Let the turkey be picked, singed, and washed and wiped dry, inside and out; joint only to the first joints in the legs, and cut some of the neck off if it is all bloody; then cut 12 small gashes in the fleshy parts of the turkey, on the outside and in different parts of the turkey, and press 1 whole oyster in each gash; then close the skin and flesh over each oyster as tightly as possible; then stuff your turkey, leaving a little room for the stuffing to swell. When stuffed sew it up with a stout cord, rub over lightly with flour, sprinkle a little salt and pepper on it, put some water in your dripping pan, put in your turkey, baste it often with its own drippings; bake to a nice brown; thicken your gravy with a little flour and water. Be sure and keep the bottom of the dripping pan covered with water, or it will burn the gravy and make it bitter.

TURNIPS, To Cook.—Full-grown turnips will take about $1\frac{1}{2}$ hours' gentle boiling; if you slice them, which most people do, they will be done sooner; try them with a fork; when tender, take them up and lay them on a sieve till the water is thoroughly drained from them. Send them up whole; do not slice them.

VEAL, To Roast.—Season a breast of veal with pepper and salt; skewer the sweet-bread firmly in its place; flour the meat and roast it slowly for about 4 hours before a moderate fire; it should be of a fine brown, but not dry; baste it with butter. When done, put the gravy in a *stew-pan*, add a piece of butter rolled in brown

flour, and if there should not be quite enough gravy, add a little more water, with pepper and salt to taste. The gravy should be brown.

VEAL CUTLETS, Broiled.—Cut the pieces of veal of an equal thickness; dip them into beaten egg, and sprinkle them with chopped herbs, parsley, mushrooms, grated lemon-peel, and crumbs of bread; broil them to a fine brown color. Make a sauce of butter and flour melted brown, moistened with veal gravy; put into it some button mushrooms, and pour the sauce hot over the cutlets.

VEAL, Stewed.—Divide into portions part of a breast of veal, and fry it of a nice brown in butter. Put into a *stew-pan* a quart of green peas, together with onions and parsley. When they are tender add some veal gravy, and put in the pieces of veal already fried, and stew the whole gently. Season with salt, pepper, and a teaspoonful of powdered sugar.

VEAL CHOPS, Breaded.—Take 6 or 7 handsomely cut chops, season them with salt and pepper, and put them into melted butter. When sufficiently soaked put them into beaten eggs, take them out, and roll each separately in bread crumbs; make the chops as round as you can with your hand, and lay them in a dish. When all are breaded, broil them slowly over a moderate fire, that the bread may not be too highly colored. Serve with clear gravy.

*** VEAL SHERBET.**—Wash a good knuckle of veal, and put it to boil in 9 pints of water. Let it boil until reduced to 2 pints. Run it through a fine sieve, and when nearly cold, add to it 2 pints of clarified syrup, and $1\frac{1}{2}$ pints of clear lemon juice. Mix well, and serve as refreshment. It will be found very nutritious, as well as pleasant.

*** VEAL BROTH.**—Put a knuckle of a leg or shoulder of veal, an old fowl, and 4 shank bones of mutton, 3 blades of mace, 10 peppercorns, an onion, a piece of bread, and 3 quarts of water into a soup pot; cover it close, and after it has boiled up and been skimmed, strain, take off the fat, and add salt.

VEGETABLES, To Boil.—Vegetables must be carefully cleaned from insects and very nicely washed. Boil them in plenty of water, the water to be boiling before they are put into it, and they should be drained the moment they are cooked enough. If over-boiled they will lose their beauty and crispness. Bad cooks sometimes dress them with meat, which is wrong—except carrots or cabbage with boiling beef.

In order to boil vegetables of a good green color, take care that the water boils when they are put in. Make them boil very fast. Do not cover, but watch them, and if the water has not slackened, you may be sure they are done when they begin to sink. Then take them out immediately, or the color will change. Hard water, especially if chalybeate, spoils the color of such vegetables as should be green. To boil them green in hard water, put a teaspoonful of carbonate of soda or potash into the water when boiling, before the vegetables are put in.

VEGETABLES, To Clean of Insects.—Make a strong brine of $1\frac{1}{2}$ lbs. of salt to 1 gal. of water; into this place the vegetables with the stalk ends uppermost for 2 or 3 hours; this will destroy all the insects which cluster in the leaves, and they will fall out and sink to the bottom of the water.

VEGETABLE OYSTERS.—Boil salsify, or vegetable oysters, till the skin will come off easily. When you have taken it off neatly, cut the root in bits as long as an oyster; put into a deep vegetable dish a layer of crumbs of bread or crackers, a little salt, pepper and nutmeg, and a covering of butter as thin as you can cut it; then a layer of oysters, and so on till your dish is filled, having crumbs at the top. Fill the dish with water, and brown them handsomely. They can remain 2 hours in the oven without injury, or be eaten in $\frac{1}{2}$ an hour.

VENISON, To Roast.—Spit a haunch of venison, and butter well 4 sheets of paper, 2 of which put on the haunch. Then make a paste of flour, butter, and water; roll it out half as big as the haunch, and put it over the fat part; then put the other 2 sheets of paper on, and tie them with pack-thread. Lay it to a brisk fire, and baste it well all the time of roasting. If a large haunch of 24 lbs., it will take $3\frac{1}{2}$ hours; smaller in proportion.

VENISON STEAKS, Broiled.—Wash them and wipe them dry. Put them on the gridiron, over a clear fire, and broil them; then season with salt and pepper, and baste them with butter. Serve with currant jelly.

WATER, To Make Cold.—Water may be kept nearly as cold as ice water, by surrounding the pitcher or jar with several folds of coarse cotton, to be kept constantly wet. The evaporation carries off the heat inside, and it will be reduced almost to freezing. In India and other tropical regions this is common.

WATER, To Soften Hard.—A $\frac{1}{2}$ oz. of quick-lime dipped in 9 quarts of water, and the clear solution put into a barrel of hard water; the whole will be soft water as it settles.

WATER, To Purify.—A tablespoonful of powdered alum sprinkled into a hoghead of water, and stirred, will in the course of a few hours precipitate to the bottom all the impure particles, and leave the water as clean and pure as spring water. 4 gallons would need but a teaspoonful.

WILD DUCKS, To Roast.—For roasting a wild duck you must have a clear, brisk fire and

a hot spit. It must be browned upon the outside without being sodden within. To have it well frothed and full of gravy is the nicety. Prepare the fire by stirring and raking it just before the bird is laid down, and 15 or 20 minutes will do it in the fashionable way; but if you like it a little more done allow it a few minutes longer; if it is too much done it will lose much of its flavor.

YEAST.—1. In 2 quarts of water let 2 oz. of hops boil for $\frac{1}{2}$ an hour; strain the liquor, and let it stand in a wide earthenware bowl. When lukewarm add a small quantity of salt—say $\frac{1}{2}$ handful—and $\frac{1}{4}$ of a lb. of sugar. Take some of the liquor, and well mix up in it $\frac{1}{2}$ a lb. of the best flour, beating this up thoroughly in the whole afterwards. The next day but one put in $1\frac{1}{2}$ lbs. of boiled and mashed potatoes; let it stand one more day, after which it may be bottled for use. It should be kept near the fire while making, so as to keep it about the temperature of new milk, and it should also be frequently stirred during the process of making. When bottled, it should be kept in a cool place. —2. Take 12 large potatoes, a pint of hops boiled in a gallon of water; mash the potatoes well, add a teacupful of sugar and 1 of salt, and 1 pint of yeast. Let it rise a day, then put it in a jug and cork it loosely; put about $\frac{1}{2}$ a pint to a gallon of bread-raising. —3. Boil 1 lb. of good flour, a $\frac{1}{4}$ of a lb. of brown sugar, and a little salt, in 2 gallons of water for an hour. When milk warm, bottle it and cork close. It will be fit for use in 24 hours. 1 pint of the yeast will make 18 lbs. of bread.

YEAST CAKES.—Put into 3 pints of water a handful of hops, and nearly a quart of pared potatoes, cut into small pieces. Boil for $\frac{1}{2}$ an hour, and strain, while scalding hot, into sufficient flour to make a stiff batter. Stir it well, adding 1 tablespoonful of fresh yeast, and set in a warm place to rise. When light, mix it stiff with Indian meal, roll out thin, and cut into round cakes or square pieces about $2\frac{1}{2}$ inches in diameter. Dry these thoroughly, and keep them in a bag in a dry place. They will remain good for months.

DRUGGIST AND CHEMIST.

ACID, CITRIC.—Juice of lemons, 4 pints; prepared chalk, $4\frac{3}{4}$ oz.; diluted sulphuric acid, $27\frac{3}{4}$ oz.; distilled water, 2 pints. Heat the juice, add the chalk; let the powder subside, and pour off the liquor. Wash the citrate of lime frequently with warm water, pour on it the sulphuric acid and water, and boil for 15 minutes; express the liquor, filter it, and evaporate with a gentle heat; then set it by to crystallize. To obtain the crystals pure, dissolve them a second and third time, filter each solution, evaporate, and set it aside to crystallize.

ADHESIVE CLOTH (for Surgeons.)—5 oz. of gum Arabic are dissolved in half a pint of hot water, and glycerine is added to give the mixture a syrupy consistence. The muslin or

linen cloth, spread out on a frame, is first coated with thin gum water, and, when nearly dry, with the glycerine mixture as rapidly as possible. Several coats are generally required. When needed for use, it is cut into strips and moistened with water.

ARTIFICIAL SKIN, for Burns, Bruises, Abrasions, etc.—(Proof against water.) Take gun cotton and Venice turpentine, equal parts of each, and dissolve them in 20 times as much sulphuric ether, dissolving the cotton first, then adding the turpentine; keep it corked tightly. Water does not affect it, hence its value for cracked nipples, chapped hands, surface bruises, and things of a like nature.

ARSENIC, Test for.—1. Dr. Baumann rec-

ommends, for detecting small quantities of arsenic, the suspected body to be triturated with from 3 to 6 times its amount of iron filings, which have been exposed to a red heat, and are known to be free from arsenic, and heating the mixture on charcoal in the reducing flame of the blow-pipe. Even with the smallest quantity of arsenic, the odor, at least, is disengaged.—2. A new and very delicate test for arsenic has been discovered by Bettendorff. Its sensibility is so great that it is said to be capable of detecting 1 part of arsenic in a million parts of solution, and the presence of antimony does not affect it. In order to apply this test, the arsenious or arsenic liquid is mixed with aqueous hydric-chloride (hydrochloric acid) until fumes are apparent; thereupon stannous chloride is added, which produces a basic precipitate containing the greater part of the arsenic as metal, mixed with stannic oxide.

ALTERATIVE (for Purifying the Blood.)—Sarsaparilla, 12 oz.; guaiacum shavings, 6 oz.; winter-green leaf, 4 oz.; sassafras-root bark, 4 oz.; elder flowers, 4 oz.; yellow dock, 3 oz.; burdock root, 4 oz.; dandelion root, 6 oz.; bitter-sweet root, 2 oz.; all bruised; place these ingredients in a suitable vessel, and add 1 pint of alcohol, with water sufficient to cover the whole handsomely. Set them in a moderately warm place for 3 or 4 days, pour off 1 pint of the tincture and set it aside, until you add water to the ingredients and boil to obtain the full strength; pour off, add more water, and boil again; then boil the 2 waters down to 1 quart; strain, and add the liquor first poured off, and add 2½ lbs. crushed or coffee sugar, and simmer to form a syrup; when cool bottle and seal up for use. **DOSE**—1 to 2 tablespoonfuls, according to the age and strength of the patient, ½ an hour before meals and at bed-time.

ALTERATIVE, RHEUMATIC.—Colchicum seed and black cohosh root, of each half an oz., the root to be bruised; best rye whisky, 1 pint; put it together, and let it stand for 3 or 4 days. **DOSE**—From 1 teaspoonful to a tablespoonful 3 times daily before meals.

ANODYNE, HOFFMAN'S.—Of sulphuric ether, 2 oz.; alcohol, 4 oz., and ethereal oil ¼ of a dr.; mix. **DOSE**—From one-half to 2 teaspoonfuls, (one-half to 2 drachms,) according to the urgency or pain for which it is given.

APERIENT, MAGNESIAN EFFERVESCING.—Sulphate of magnesia, 12 oz.; tartaric acid, 8 oz.; calcined magnesia, 3 oz.; pure sugar, 18 oz.; bicarbonate of soda, 6 oz.; essence of lemon, 30 drops. Dry the powders separately, mix and sieve them, then bottle securely. 2 or 3 teaspoonfuls in water is sufficient for a dose.

ASTHMA REMEDIES.—1. Elecampane angelica, comfrey and spikenard roots, with hoarhound tops, of each 1 oz.; bruise and steep in 1 pint of honey. **DOSE**—1 tablespoonful, taken hot every few minutes until relief is obtained; then several times daily until a cure is effected.—2. Oil of tar, 1 dr.; tincture of veratrum viride, 2 dr.; simple syrup, 2 dr.; mix. **DOSE**—for adults, 15 drops 3 or 4 times daily. Iodide of potassium has cured a bad case of asthma by taking 5 gr. doses 3 times daily. Take half an oz. and put into a phial, and add 32 teaspoonfuls of water; then 1 teaspoonful of it will contain the 5 grs., which is to be put into half a gill

more of water, and is to be drank a short time before each meal.

BALSAM, GLYCERINE.—White wax and spermaceti, of each 1 oz.; almond oil, 8 oz.; glycerine, 2 oz.; otto of roses, 15 drops.

BALSAM OF HONEY.—Balsam of tolu, 1 oz.; gum storax, 1 dr.; purified opium, 16 gr.; best honey, 4 oz.; rectified spirits of wine, 1 pint. Digest them together for a week, and strain the liquor. This prescription is of great use in colds and habitual coughs, unaccompanied by feverish symptoms. The dose is from 1 to 3 teaspoonfuls occasionally.

BALSAM, INDIAN.—Clear, pale resin, 3 lbs., and melt it, adding spirits of turpentine, 1 quart; balsam of tolu, 1 oz.; balsam of fir, 4 oz.; oil of hemlock, origanum, with Venice turpentine, of each, 1 oz.; strained honey, 4 oz. Mix well and bottle. **DOSE**—6 to 12 drops, for an adult; for a child of 6 years, 3 to 5 drops on a little sugar. The dose can be varied according to the ability of the stomach to bear it, and the necessity of the case. This is a valuable preparation for coughs or internal pains.

BALSAM, MITCHELL'S, for Bruises, Cuts, etc.—Fenugreek seed and gum myrrh, of each, about 1 oz.; sassafras-root bark, a good handful; alcohol, 1 quart. Put all into a bottle, and keep warm for 5 days.

BALSAM OF TOLU.—Take of balsam of tolu, 6 oz.; white resin, 16 oz.; sheep's suet, 1¼ oz., or sufficient to make it soft enough, according to climate or season.

BALM OF GILEAD.—The genuine balsam of Mecca is the juice of the Amyris Gileadensis, and is obtained by cutting the bark of the tree with an axe. It is both scarce and costly, and none of it ever reaches this country as an article of commerce. That which is exported is obtained by boiling the twigs of the balsam tree in water. The real balsam of Mecca is of a clear gold color, and possesses a penetrating and delicate fragrance, and a sharp, bitter, astringent taste. A drop let fall on the surface of hot water spreads itself over the whole surface, like a thin film of oil, and again contracts on the water cooling. It dissolves completely in fatty and essential oils, which then assume the peculiar flavor of the balsam.

BALM OF GILEAD, Imitation.—Benzoin, 1 lb.; yellow resin, 14 lbs. Melt, and add oil of lemon, 4 oz.; oil of rosemary, 4 oz.; oil of caraway, 4 oz.; spirit to reduce it to a proper consistence.

BALM OF A THOUSAND FLOWERS.—Deodorized alcohol, 1 pint; nice, white bar-soap, 4 oz.; shave the soap when put in; stand in a warm place until dissolved; then add oil of citronella, 1 dr.; oils of neroli and rosemary, of each ¼ a dr.

BALM OF BEAUTY.—Pure soft water, 1 quart; pulverized castile soap, 4 oz.; emulsion of bitter almonds, 6 oz.; rose and orange flower water, of each 8 oz.; tincture of benzoin, 2 dr.; borax, 1 dr.; to use, apply on a cotton or linen cloth to the face, etc.

BALLS for Removing Grease and Paint Spots from Cloth, etc.—Fuller's earth, 30 parts; French chalk, 1 part; yellow soap, 20 parts; pearlash, 15 parts. Make into a paste with spirits of turpentine, and give it a slight color with a little yellow ochre, and then cut it into cakes. This form, omitting the French chalk, is

that which is so very generally sold about the streets.

BALLS, CAMPHOR (for Chapped Hands, etc.)—1. Spermaceti, white wax, each $\frac{3}{4}$ oz.; almond oil, 1 oz.; alkanet to color. Melt, strain, and add 3 drs. of powdered camphor.—2. Lard, wax, and almond or olive oil, equal parts, with a little powdered camphor. Used to rub over the hands after washing to prevent chaps.

BALMONEY HERB.—This is a tonic and laxative, and is employed to good advantage in jaundice, dyspepsia, diseases of the liver, loss of appetite, and general debility.

BANDOLINE, A Compound for Stiffening the Hair.—1. Quince seed, $\frac{3}{4}$ of a teaspoonful; linseed, 1 tablespoonful, and a pinch of white mustard seed. Boil in a pint of soft water to half a pint, and scent with oil of almonds.—2. Isinglass, 1 oz.; water, 1 pint; proof spirit, 2 fluid oz. Dissolve the isinglass in the water by heat, add the spirit, and scent with almond oil.—3. Tragacanth, 1 oz.; rose water, 1 pint. Bruise the gum, digest for 3 days, and strain.

Any of these may be colored with cochineal, if required.

BANDOLINE, ROSE.—Gum tragacanth, 6 oz.; rose-water, 1 gal.; otto of roses, $\frac{3}{4}$ of an oz. Steep the gum in the water for a day or so. As it swells and forms a thick, gelatinous mass, it must from time to time be well agitated. After about 48 hours' maceration it is to be squeezed through a coarse, clean linen cloth, and again left to stand for a few days, and passed through a linen cloth a second time, to insure uniformity of consistency; when this is the case the otto of rose is to be thoroughly incorporated with it.

BARK, AMERICAN POPLAR.—A tea made of this bark is very useful in cases of debility, especially those of long standing, and also for feeble digestion, worms, and a diseased condition of the urinary organs. Consumptive people have received great benefit from its employment.

BARK, WILD CHERRY.—The bark of the tree and kernels of the cherry contain a great deal of prussic acid, to which their medicinal virtues are to be attributed. The bark is a very powerful antiseptic, and is very useful in the preparation of dentifrice. It is also useful in diarrhea, jaundice, and for worms. Generally taken in infusion, an oz. of the powder to a quart of boiling water. The cherries also are used in medicine, and may be employed with or without peach-kernels. They are useful as a tonic and a remedy for indigestion, and particularly as a restorative for convalescents from dysentery. Made in a syrup, or bruised and given in decoction.

BARKS, To Preserve.—Barks may be conveniently preserved by placing them in coarse brown paper bags, and hanging them up, in a dry and airy situation, until all extraneous moisture has evaporated.

BAYRUM.—This is a spirit distilled over the leaves of Myrsine, and perhaps, also some other species of the same genus. The trees grow in the West India Islands, and the genuine bay rum is imported from there into this country. It is made elsewhere, sometimes, by taking the tincture of bay leaves, 5 oz., oil of bay, 1 dr., bicarbonate of ammonia, 1 oz., bo-

rax, 1 oz., rose-water, 2 pints. Mix and filter carefully.

BEARS' GREASE (Artificial).—Bears' grease is imitated by a mixture of prepared veal suet and beef marrow. It may be scented at pleasure.

BITTERS, AGUE.—Quinine, 40 grs.; capsicum, 20 grs.; cloves, $\frac{1}{4}$ oz.; cream of tartar, 1 oz.; whiskey, 1 pint; mix. Dose—1 to 2 tablespoonfuls every 2 hours, beginning 8 hours before the chill comes on, and 3 times daily.

BITTERS, Cathartic and Tonic.—Best rye whiskey, and water, of each 1 quart; best underground Peruvian bark, colombo root and prickly ash berries, of each 2 oz.; prickly ash, black cherry and poplar barks, of each 1 oz.; poke-root, mandrake-root, and cloves, of each $\frac{1}{2}$ an oz.; all to be the dry articles, and all to be pulverized before they are put into the spirits; they should be well shaken every day for a week, by which time the bitters will be ready for use. Dose—1 to 2 tablespoonfuls at morning and evening meals.

BITTERS, BLACKBERRY.—The berry, when ripe, is known to be pleasant and wholesome, and 2 handfuls of the root, in 3 pints of milk or water, boiled down to a quart, in the dose of a teacupful every 2 or 3 hours, has often cured diarrhea and dysentery when other things have failed.

BLADDERS, PREPARED.—Cut off the loose fat, wash in a weak solution of chloride of lime, and rinse in clear water. When drying, blow them tight and keep them expanded. Used to tie over jars, pots, etc., and to contain powdered pigments.

BLISTERING TISSUE.—A solution of cantharides is made in alcohol, acetic acid, or ether, strained and evaporated to an extract, which is then mixed with twice its weight of wax, and spread on silk or thin paper.

BLOOD, Tests for.—Iodide of potassium dissolves traces of blood, even from clothing which has been thoroughly washed, but hæmin crystals cannot be obtained from the solution.

Gunning has discovered, in the acetate of zinc, a reagent that precipitates the slightest traces of the coloring matter of blood from solutions, even where the liquids are so dilute as to be colorless. Blood, washed from the hands in a pail of water, can readily be detected in this way. The flocculent precipitate, thrown down by the acetate of zinc, must be washed by decantation, and finally collected on a watch glass, and allowed to dry, when the microscope will readily reveal hæmin crystals, if any blood be present. This test has been repeatedly tried, with entire success.

A lately discovered method consists in the application of tincture of guaiacum and ozonized ether, which produces a beautiful blue tint with blood or blood-stains. This test is excessively delicate. Ozonized ether is merely a solution of per-oxide of hydrogen in ether.

BLOOM OF ROSES.—Strong liquid ammonia, $\frac{1}{4}$ oz.; finest carmine, $\frac{1}{4}$ oz.; rose-water, 1 pint; triple extract of roses, $\frac{3}{4}$ oz. Put the carmine into a pint bottle, and pour the ammonia on it; allow them to remain together, with occasional agitation, for 2 days; then add the rose-water and esprit, and well mix. Place the bottle in a quiet situation for a week; any precipitate of impurities from the carmine will subside; the supernatant Bloom of roses is then

to be bottled. If the carmine was perfectly pure there would be no precipitate; nearly all the carmine purchased from the makers is more or less sophisticated, its enormous price being a premium to its adulteration.

BLOOM, ALMOND.—Boil 1 oz. of Brazil wood in 3 pints of water for 15 minutes; strain, add $\frac{1}{4}$ of an oz. of isinglass, $\frac{1}{4}$ of an oz. of cochineal, 1 oz. of alum, and $\frac{1}{4}$ of an oz. of borax; dissolve by heat, and strain.

BLUE FLAG.—Blue flag grows by the brink of rivers, and in swamps and meadows. It blossoms in July, and has blue flowers, variegated with white, yellow, and purple. A teaspoonful of the juice, diluted with water, is an active cathartic, and the decoction for constant drink is used in venereal complaints.

BROMIDE OF POTASSIUM, its Preparation.—The commercial bromide of potassium is very rarely pure. The impurities consist principally of chloride of potassium, (up to 30 p. c.), sulphate of potassa, (up to 3.3 p. c.), free or carbonate of alkali, (up to 4 per c.), iodide of potassium, and bromate of potassa. It is impossible to produce from such a mixture, by simple operations, a perfectly pure article, and the purification of the bromine employed to this end is rendered necessary. This is effected best by shaking the commercial bromine with water and a little ether.

The chloride of bromine, being easily soluble in ether, is dissolved, and, by the agency of the water, converted into hydrochloric acid and bromine. By washing in this way several times, each time removing the aqueous solution, chlorine may be separated entirely from the bromine. Shaking then the resulting bromine with a little starch paste, which removes the iodine, and distilling it, an article is obtained free from chlorine and iodine. This is dissolved in a solution of caustic potassa, free from sulphuric and hydrochloric acid, and the resulting liquor, a mixture of bromide of potassium with bromate of potassa, evaporated to dryness and ignited. The mass is then dissolved in water and crystallized, when it will be of sufficient purity to serve for all medical purposes.

Robierre and Herbelin recommend a method by which bromide of potassium may be freed from iodine. They dissolve it to this end in very little water, add gradually bromine water, and heat the solution to boiling. After each addition of bromine water, the fluid is tested with starch paper, which will indicate the disappearance of the iodine by not turning blue. An excess of bromine must be avoided. Bromine will displace iodine in all its compounds. The solution is then evaporated to dryness, and the dry mass re-crystallized.

BROWN'S BRONCHIAL TROCHES.—Take 1 lb. of pulverized extract of licorice, $1\frac{1}{2}$ lbs. of pulverized sugar, 4 oz. of pulverized cubebs, 4 oz. of pulverized gum Arabic, and 1 oz. of pulverized extract of conium. Mix.

BURDOCK.—Burdock operates gently on the bowels, sweetens the blood, promotes sweat and urine, and is used in rheumatic, scorbutic, scrofula, and venereal diseases. Dose.—Of the juice, a wine-glassful; of the decoction, half a pint 3 times a day.

CADAVER, Preservation of.—According to M. Devergie, of the Paris School of Practical Anatomy, a mixture of 3 parts of glycerine and

1 of carbolic acid, injected into dead bodies, will prevent any unpleasant odor emanating from them for several months.

CAMPHOR, To Pulverize.—Take camphor, 2 oz.; alcohol, 3 oz.; water sufficient; carbonate of magnesia, 1 drachm. Dissolve the camphor in the alcohol with the aid of heat and filter. Rub the magnesiac carbonas with water, mix with the solution, and catch on a filter; dry the mass before the sun, and pass through a sieve No. 60.

CAMPHOR ICE.—Spermaceti, $1\frac{1}{4}$ oz.; gum camphor, $\frac{1}{4}$ of an oz.; oil of sweet almonds, 4 teaspoonsful; set on the stove in an earthenware dish till dissolved; heat just enough to dissolve it. While warm pour into small moulds, then paper, and put into tinfoil; used for chaps on hands and lips.

CARBONATE OF MAGNESIA.—Sulphate of magnesia, 4 lbs.; carbonate of soda, 4 lbs. 9 oz.; boiling, distilled water, 4 gallons. Dissolve separately the carbonate and sulphate in 2 gallons of water; filter and mix. Boil and stir for 2 hours, adding distilled water as required; pour off the fluid, wash the powder with boiling, distilled water, and dry it.

CARMINATIVE, DALBY'S.—Carbonate of magnesia, 2 scruples; oil of peppermint, 1 drop; oil of nutmeg, 2 drops; oil of aniseed, 3 drops; tincture of castor, 30 drops; tincture of assafoetida, 15 drops; tincture of opium, 5 drops; spirit of pennyroyal, 15 drops; compound tincture of cardamons, 30 drops; peppermint water, 2 oz. Mix.

CARMINE.—1 lb. of powdered cochineal is boiled in a tin or enameled vessel for 2 hours with $9\frac{1}{2}$ gallons of rain or ice water; 1 oz. of saltpetre is then added, and 4 minutes afterward 2 oz. of bioscalate of potassa, the whole being kept boiling for 10 minutes longer. A very small quantity of gelatine, in the solution, is then stirred in, and the mixture allowed to rest for 4 hours, upon which the clear liquid is decanted into flat porcelain dishes there to deposit. The latter operation requires several weeks. The sediment, which ought to be pure carmine, is then dried in the shade.

CATHARTIC SYRUP.—Best senna leaf, 1 oz.; butternut, the inner bark of the root, dried and bruised, 2 oz.; peppermint leaf, 1 oz.; fennel seed, 1 oz.; alcohol, 1 pint; water, 2 pints; sugar, 2 lbs.; put all into the spirit and water, except the sugar, and let it stand 2 weeks, then strain, pressing out from the dregs, adding the sugar, and simmering a few minutes only, to form the syrup. If it should cause griping in any case, increase the fennel seed and peppermint leaf. Dose.—1 tablespoonful, once a day, or less often, if the bowels become too loose.

CATAPLASM, PRADIER'S.—Balm of Mecca, 6 drs.; rectified spirit, 16 oz.; dissolve; red bark, sarsaparilla, and sage, of each 1 oz.; saffron, $\frac{1}{4}$ of an oz.; rectified spirit, 32 oz.; digest for 48 hours; filter; mix the two liquors, and add twice their weight of lime water. Used in gout, by sprinkling 2 oz. on the surface of a hot linseed-meal poultice.

CAUSTIC PASTE, for Surgeons' Use.—Melt together equal parts of caustic potash and gutta percha, and cast in molds in the same manner as pure potash or nitrate of silver. In order to produce a serviceable article, great care is necessary that the ingredients be pure.

CAUSTIC, Velpau's Black.—Triturate in a porcelain mortar 30 grammes powdered licorice root, and add sulphuric acid in small quantities, until a mass of suitable consistence is obtained, which must be neither too hard nor too liquid.

CERATE, CAMPHOR.—Fresh hog's lard, $3\frac{1}{4}$ oz.; grated camphor, 1 oz. Dissolve the lard by boiling water round a cup; then gradually add the camphor; stir well, and when cooling pour off the sediment.

CERATE OF ACETATE OF LEAD.—Powdered acetate of lead, 5 drachms; white wax, 5 oz.; olive oil, 1 pint. Dissolve the wax in 18 oz. of the oil; add to this the lead mixed with the remainder of the oil, and stir with a spatula until they are thoroughly mixed. Applied to burns, excoriations, irritable ulcers, and sores generally.

CERATE OF CANTHARIDES.—Cantharides rubbed to fine powder, 1 oz.; spermaceti cerate, 6 oz. Melt the cerate, and add the cantharides. Employed to promote the discharge from a blistered surface.

CERATE OF LEAD, Compound.—Solution of diacetate of lead, 6 oz.; wax, 8 oz.; olive oil, 1 pint; camphor, 1 drachm. Mix the wax, when melted, with 16 oz. of the oil, and when cooling add the lead; stir until cool, and then add the camphor dissolved in the rest of the oil. Used as the former lead cerate.

CHARCOAL OF WOOD.—In 15 or 16 cases of obstinate constipation of the bowels, Dr. Daniel, of Georgia, administered 3 tablespoonfuls of pulverized charcoal every $\frac{1}{2}$ hour, and in about 17 hours the bowels were freely evacuated. It is slow, but sure. A tablespoonful 2 or 3 times a day will remove costiveness. In smaller doses it corrects bad breath, and also prevents putrid belching of wind from the stomach. It is a very powerful antiseptic, or anti-mortification remedy.

CHARCOAL, PREPARED.—Fresh-made charcoal in fine powder, 7 lbs.; prepared chalk, 1 lb.; orris root, 1 lb.; catechu, $\frac{1}{2}$ lb.; cassia bark, $\frac{1}{2}$ lb.; myrrh, $\frac{1}{4}$ lb. Sift.

CHAMOMILE.—A warm decoction of the flowers in large quantities will act as an emetic; in small doses, taken cold, it is an excellent tonic to strengthen the stomach.

CHERRY PECTORAL, AYER'S.—Take 4 grains of acetate of morphia, 2 fluid drachms of tincture of blood-root, 3 fluid drachms each of antimonial wine and wine of ipecacuanha, and 3 fluid oz. of syrup of wild cherry. Mix.

CHLOROFORM.—Chlorinated lime, 4 lb.; rectified spirit, $\frac{1}{2}$ pint; water, 10 pints; chloride of calcium, in pieces, 1 drachm. Put the mixed lime and water into a retort; add the spirit so that all occupies only one-third of the retort. Heat it in a sand-bath, and when ebullition commences at once withdraw the heat, lest the retort be broken. Let the liquid distill into the receiver, while heating subsides, and applying heat again when necessary. To the distilled liquid add one-fourth of the water, and mix well. Separate the heavier portion, which subsides, and add the chloride to it; frequently shake during half an hour, and re-distill from a glass retort into a glass receiver.

CHLOROFORM.—Prof. Nussbaum has succeeded in prolonging the anesthesia induced by chloroform, by the sub-cutaneous injection of a solution containing 1 grain of acetate of morphia. In one case the patient slept 12 hours, and un-

derwent a painful operation without experiencing any sensation whatever. The injection, performed without the previous inhalation of chloroform, produced no such effect.

CHLORODYNE, J. Collis Brown's.—Burnt sugar, 1 drachm; hydrochlorate of morphia, $\frac{1}{2}$ grain; distilled water, 2 drachms; oil of peppermint, 6 minims; diluted prussic acid, (Ph. L.) 5 minims; tinc. capsicum, 7 minims; chloroform, 1 drachm. Mix.

CHOLAGOGUE, INDIA.—Quinine, 20 gr.; Peruvian bark, (pulverized,) 1 oz.; tartaric acid, 1 scruple; brandy, 1 gill; water enough to make 1 pint. Dose—5 teaspoonfuls every 2 hours, in the absence of fever.

CHLORAL, HYDRATE OF.—The use of this new remedy, either as an anodyne, a sedative, or a hypnotic, has, at this writing, become very prevalent, and there is danger that not a little harm may result therefrom. Eminent physicians say that it aggravates many diseases—as rheumatism and skin diseases—and causes irritation of the mucus surfaces of the nose and throat. It also causes dimness of sight. One case is reported where a man took an over-dose, slept for 24 hours, and, on awaking, found his legs and arms paralyzed. Its effects are, of course, various in different individuals. A peculiar diagnostic sign of its effects is a black streak on the tongue, like that caused by ink, extending its whole length in the centre.

For these reasons its use should be discarded, especially so because the habit of using it, when once formed, is exceedingly hard to break off, and attempts to do so have resulted in symptoms not unlike those of delirium tremens.

It has been found on trial to be an excellent suppurative agent. According to the time it is left on the skin, it becomes a perfect rubefacient, irritant, suppurative, or even escharotic. The mode of application is to take a piece of fresh adhesive plaster, of the size wanted, and crush fine, on its surface, with an ivory spatula, enough of the crystals of the chloral to powder the piece of adhesive plaster quite evenly; use the edge of the spatula to take off the chloral where it is more than a mere dust in thickness, but distribute evenly, leaving $\frac{1}{4}$ of an inch margin for adhesion; heat the back of the plaster for an instant only, and apply. Leave it on about $\frac{1}{2}$ an hour as a rubefacient, 6 hours as an irritant. To produce suppuration, put the chloral on the plaster in larger quantities, and leave on from 24 to 36 hours; on its withdrawal apply a stimulating salve, and afterwards heal with cerate. For an escharotic effect apply the chloral, thickly spread, and after 12 hours repeat the application, if necessary.

COAL-GAS, Detection of Sulphur in.—The presence of sulphur in coal-gas can be proved in the following simple manner: Let a platinum basin be filled with half a litre of water, and the basin be heated over a Bunsen burner until all the liquid has evaporated; the basin will be found to be coated on the outside, where it has been struck by the flame, with a dirty, greasy-looking substance, which, on being washed off with pure distilled water and tested proves to be sulphuric acid. The glass chimneys used with Argand gas-burners soon become coated over internally with a white substance, which, on being washed off with distilled water, will be found to be, on testing, sulphate of ammonia.

The glass panes of a room wherein gas is burned for a few evenings consecutively will, when rubbed with the fingers of a clean hand, impart to it a substance which, on the hand being rinsed in distilled water, will yield a precipitate of sulphate of baryta with chloride of barium, and a brick-red precipitate with potassium iodide of mercury.

COLORS, DRUGGISTS'.—Yellow.—Take iron filings, hydrochloric acid to dissolve. Dilute with water. **Red.**—Solution of sal ammoniac, cochineal to color. **Blue.**—1. Sulphate of copper, 1 part; alum, 1 part; water, 16 parts; oil of vitriol, q. s.—2. Indigo, 1 part; oil of vitriol, 3 parts. Dissolve, and then dilute with water. **Green.**—1. Verdigris; dilute sulphuric acid to dissolve. Dilute with water.—2. Verdigris, 1 part; acetic acid, 3 parts. Dissolve, and dilute with water. **Purple.**—1. Sugar-of-lead, 1 oz.; cochineal, 25 grains.—2. Infusion of logwood, water of ammonia, q. s.

COMFREY.—Comfrey boiled in milk is excellent in dysentery and bowel complaints, immoderate courses, and other diseases. It is beneficial in all cases attended with burning heat in urinary evacuations. A poultice of the pounded root is good for wounds and inflammatory swellings.

COTTON for Staunching Hemorrhage.—A new preparation.)—American cotton of the best quality should be cleansed by boiling it for an hour in a weak solution of soda, (about 4 per cent.,) then repeatedly washed in cold water, pressed out and dried. By this process it will be perfectly disinfected, and adapted to more ready absorption. After this it should also be steeped once or twice, according to the degree of strength required, in liquid chloride of iron, diluted with $\frac{1}{2}$ water, pressed, and thoroughly dried in the air—neither in the sun nor by the fire—then lightly pulled out. The cotton so prepared will be of a yellowish-brown color. It must be kept very dry, as it is affected by the damp. Lint may be similarly treated, but the fine texture of the cotton renders it preferable. When placed on a fresh wound, it causes a moderate contraction of the tissue, and gradually coagulates the blood in and beyond the injured veins, thus closing the source of the effusion. This property of the chloride of iron is increased by the dryness of the cotton and the extended surface offered for the development of the chemical action.

CORDIAL, GODFREY'S.—Sassafras, 6 oz.; seeds of coriander, caraway, and anise, of each 1 oz.; infuse in 6 pints of water; simmer the mixture till reduced to 4 pints, and then add 6 lbs. of molasses; boil a few minutes; when cold, add 3 fluid oz. of tincture of opium.

CORDIAL, GOUT.—Rhubarb, 1 oz.; senna and red sanders, of each 2 drachms; coriander and fennel seeds, of each 1 drachm; saffron and licorice, of each $\frac{1}{2}$ drachm; stoned raisins, 6 oz.; proof spirit, 48 oz.; macerate for 14 days, express and filter. Dose— $\frac{1}{2}$ to 1 $\frac{1}{2}$ oz.

COUGH CANDY, Medicated.—To 5 lbs. of candy just ready to pour on the slab, add the following mixture, and form it into sticks: Tincture of squills, 2 oz.; camphorated tincture of opium and tincture of tolu, of each $\frac{1}{4}$ oz.; wine of ipecac, $\frac{1}{4}$ oz.; oils of gaultheria, 4 drops; sassafras, 3 drops, and of anise seed oil, 2 drops. Use this freely in common coughs.

COUGH COMPOUND.—For the cure of coughs, colds, asthma, whooping cough, and all diseases of the lungs: 1 spoonful of common tar, 3 spoonfuls of honey, the yolks of 3 hen's eggs, and half a pint of wine; beat the tar, the eggs, and the honey well together with a knife, and bottle for use. A teaspoonful every morning, noon and night, before eating.

COURT PLASTER.—Soak bruised isinglass in a little warm water for 24 hours, then evaporate nearly all the water by gentle heat; dissolve the residue in a little proof spirits of wine, and strain the whole through a piece of open linen. The strained mass should be a stiff jelly when cool. Now extend a piece of silk on a wooden frame, and fix it tight with tacks or pack thread. Melt the jelly, and apply to the silk thinly and evenly with a badger hair brush.

A second coating must be applied when the first has dried. When both are dry, cover the whole surface with coatings of balsam of Peru, applied in the same way. Plaster thus made is very pliable, and never breaks.

CREAM, COLD.—Oil of almonds, 4 oz.; white wax and spermaceti, of each 2 drachms; melt; add rose water, 4 oz.; orange-flower water, 1 oz. Used to soften the skin.

CREAM, COLD, VIOLET.—Almond oil, $\frac{1}{4}$ lb.; oil of cassie, $\frac{1}{4}$ lb.; rose water, 1 lb.; sperm, 1 oz.; wax, 1 oz.; otto of almonds, $\frac{1}{4}$ drachm.

CREAM, CIRCASSIAN.—Olive oil, 1 pint; white wax, 3 oz.; spermaceti, 2 oz.; alkanet root, $\frac{1}{4}$ oz. Warm the oil and alkanet, then strain, and add it to the melted spermaceti and wax. Scent with 3 drachms of English oil of lavender, and 1 drachm of essence of ambergris. Used for the hair.

CREAM, CRYSTALLINE.—Olive oil, 3 lbs.; spermaceti, 4 to 6 oz.; melt, cool, and add essence of bergamotte and essence of lemon, of each 6 drachms; oil of cinnamon, 20 drops; otto of rose, 1 drachm. Mix. Fragrant. Used for the hair.

CREAM, SHAVING.—White wax, spermaceti, and almond oil, of each $\frac{1}{4}$ oz.; and while warm beat in 2 squares of Windsor soap, previously reduced to a paste with rose water.

CREAM OF ROSES.—Oil of almonds, 1 lb.; rose water, 1 pint; white wax and spermaceti, each 1 oz. Mix in a pipkin with a little heat, then add essence of neroli, 20 drops; otto of roses, 15 drops. Put it into pots, and tie it over with skin or oiled leather.

CEPHALIC SNUFF.—1. Asarabacca leaves (dried,) 3 parts; marjoram and lavender flowers, of each 1 part. Mix in fine powder.—2. (Boeli's.) Valerian and snuff, of each 2 drs.; oil of lavender and oil of marjoram, of each 3 drops. Mix.

DANDELION.—A decoction of dandelion will correct an unhealthy state of the stomach and liver, and procure an appetite. It is diuretic, and very beneficial in jaundice. Given in the form of extract, in from 3 to 5 grain doses, 3 times a day, and continued for a long time, it has the happiest effect upon the liver when its disease has assumed a chronic form. The best way of preparing it, is to gather the roots in August and September, press out the juice, and evaporate in shallow dishes exposed to a dry, warm air.

DENTIFRICE, Circassian.—Prepared harts-

horn, 2 oz.; sulphate of potash, 2 oz.; cuttle-fish bone, 8 oz.; orris root, 4 oz.; yellow sandal wood, 1 oz.; rose pink, 3 oz.; oil of rhodium, 30 drops. Mix the powdered ingredients, and add the rhodium.

DENTIFRICE, Myrrh.—Myrrh, 1 oz.; cuttle-fish bone, 4 oz.; orris, 3 oz. Mix.

DENTIFRICE, Cartwright's.—Of prepared chalk, 1 oz.; orris, 1 oz.; castile soap, 1 drachm.

DENTIFRICE, Camphorated.—Precipitated chalk, 1 lb.; powdered orris root, $\frac{3}{4}$ lb.; powdered camphor, $\frac{1}{4}$ lb.

DENTIFRICE, Charcoal.—Fresh charcoal in fine powder, 7 lbs.; prepared chalk, 1 lb.; orris root, 1 lb.; catechu, 1 lb.; cassia bark, 1 lb.; myrrh, $\frac{1}{4}$ lb. Sift.

DENTIFRICE, Cuttle Fish.—Powdered cuttle fish, 1 lb.; precipitated chalk, 1 lb.; powdered orris, 1 lb.; otto of lemons, 1 ounce; otto of neroli, 1 drachm.

DEPILATORIES.—Depilatory is a term which is applied to any application that removes hair from the human skin. Depilatories act either mechanically or chemically. To the first belong adhesive plasters, that on their removal from the skin bring away the hair with them; equal parts of pitch and resin have been used for this purpose. To the second class belong those substances which act upon the bulbous roots of the hairs, and destroy their vitality. The former method is more painful, but less dangerous, than the latter one. The following are the principal depilatories at present employed in the fashionable world: 1. (*Delcroix's Poudre Subtile*).—Orpiment, 1 part; finely powdered quicklime and starch, of each 11 parts; mix. It should be kept from the air. For use, make it into a paste with a little warm water, and apply it to the part, previously shaved close. As soon as it has become thoroughly dry, it may be washed off with a little warm water. 2. (*Oriental Ruzma*).—Quicklime, 2 oz.; orpiment, $\frac{1}{2}$ oz.; strong alkaline lye, 1 lb.; boil together until a feather dipped into it loses its flue. It is applied to the skin, previously soaked in warm water, by gentle friction, for a very short time, followed by washing with warm water. This is one of the most certain and powerful depilatories made, but rapidly loses its strength unless kept in a well-stoppered glass bottle. 3. (*Chinese Depilatory*).—Quicklime, 1 lb.; pearlash and sulphuret of potassium, of each 2 oz.; reduce them to a fine powder, and keep it in well-corked bottles. Use like *Poudre Subtile*. 4. (*Rayer's Depilatory*).—Lime, 1 oz.; carbonate of potash, 2 oz.; charcoal powder, 1 drachm. This and No. 3 are preferred by those persons who do not approve of the use of arsenic. 5. (*Depilatory Paste*).—Quicklime, 1 oz.; orpiment and orris root, of each 3 drachms; salt-petre and sulphur, of each 1 drachm; soap-lees, $\frac{1}{2}$ pint; evaporate to a proper consistence. It should be kept from the air.

DR. KITTREDGE'S REMEDY for Rheumatism and Stiff Joints.—Strong camphor spirits, 1 pint; neats-foot, coon, bear, or skunk's oil, 1 pint; spirits of turpentine, 1 pint. Shake the bottle when used, and apply 3 times daily, by pouring on a little at a time, and rubbing in all you can for 20 to 30 minutes.

DR. PEABODY'S CURE for Neuralgia (Internal Remedy).—Sal ammoniac, $\frac{1}{2}$ drachm; dissolve in water, 1 oz. Dose—1 tablespoonful

every 3 minutes for 20 minutes, at the end of which time, if not before, the pain will have disappeared.

DROPS OF LIFE, Welford's.—Gum opium, 1 oz.; gum kino, 1 drachm; gum camphor, 40 grains; powdered nutmegs 1 oz.; French brandy or Jamaica spirits, 1 pint; color with cochineal or saffron. Before taking cleanse the bowels with castor oil. For a grown person 20 to 40 drops 3 or 4 times per day. For children, 4 to 6 drops; administer in a little warm mint tea, in which is mixed as much prepared chalk as will lie on the handle of a teaspoon.

DROPS, IMPERIAL, for Gravel and Kidney Complaints.—Oil of origanum, 1 oz.; oil of hemlock, $\frac{1}{4}$ oz.; oil of sassafras, $\frac{1}{4}$ oz.; oil of anise, 1 oz.; alcohol, 1 pint; mix. Dose—1 teaspoonful 3 times a day, in sweetened water; this will soon give relief when constant weakness is felt across the small of the back, as well as gravely affections causing pain about the kidneys.

DROPS, DIURETIC.—Oil of cubebs, 1 oz.; sweet spirits of nitre, 1 oz.; balsam of copaiba, 1 oz.; Harlem oil, 1 bottle; oil of lavender, 20 drops; spirits of turpentine, 20 drops; mix. Dose—10 to 25 drops, as the stomach will bear, 3 times daily.

DROPS, PECTORAL (Bateman's).—Paregoric, 10 oz.; tincture of castor, 4 oz.; laudanum, 1 oz.; tincture of saffron, 1 oz.; oil of aniseed, 15 drops. Mix. Dose—1 teaspoonful in case of coughs or colds.

DROPS, DUTCH (or Harlem).—Take balsam of turpentine, 2 oz.; oil of turpentine, 10 oz. Mix.

EAU DE CHYPRE.—Extract of musk, 1 pint; ambergris, vanilla, tonquin bean, orris, of each half a pint; triple extract of rose, 2 pints. The mixture thus formed is one of the most lasting odors that can be made.

EAU DE BOTOT, for the Teeth.—Tincture of cedar wood, 1 pint; tincture of myrrh, 1 oz.; oil of peppermint, half a drachm; oil of spearmint, half a drachm; oil of cloves, 10 drops; oil of roses, 10 drops. Mix.

EAU POUR LES DENTS.—Cinnamon, 2 ounces; cloves, 6 drachms; fresh lemon peel, 2 ounces; dried rose petals, 1 ounce; scurvy grass, 8 ounces; spirits, 3 pounds; macerate, 24 hours, and distil in a water-bath.

EAU DE MILLEFLEURS.—Spirit of cummin seed, oils of sassafras and rosemary, of each 10 drops; oil of lavender, and otto of roses, of each 2 drachms; neroli, half a drachm; oils of pimento and cloves, of each 20 drops; essence of bergamotte, 4 drachms; oil of orange, 1 drachm; essence of lemon, 8 ounces; vanilla, 1 scruple; elder-flower water, 4 ounces; rectified spirit, 30 ounces; mix and filter.

EAU DE BOUQUET.—1. Spirit of rosemary and essence of violets, of each 1 ounce; essence of bergamotte and jasmine, of each 1 drachm; oils of verbena and lavender, each 1 scruple; eau de rose, half a pint; orange-flower water, 1 ounce; rectified spirit, 2 pints; mix, digest and filter.—2. Honey-water, 2 ounces; tincture of cloves, 1 ounce; tinctures of calamus, of lavender, and of long cypress, each half an ounce; eau sans pareille, 4 ounces; spirit of jessamine, 9 drachms; tincture of orris, 1 ounce; tincture of neroli, 20 drops; mix and filter.

EAU DE ROSIERES.—Spirits of roses, 4

pints; spirits of jessamine, 1 pint; spirits of orange flowers, 1 pint; spirits of cucumber, $2\frac{1}{4}$ pints; spirits of celery seed, $2\frac{1}{4}$ pints.

EAU DE VIOLETTES.—Macerate 5 oz. of fine orris root in a quart of rectified spirits, for some days, and filter.

ERGOT.—The diseased production of rye; on some occasions, when the grain has been spurred or covered with ergot, it has caused death frequently to the partakers; medically it is administered to contract the uterus in labor, and it is very powerful in this case. The active property appears to reside in the oil, which is taken up by hot water, (tea, etc.,) alcohol, and ether, and these preparations are generally administered uncombined with other medicines. Powdered ergot is given in repeated doses of 10 to 20 grains, or in one dose of half a drachm, in which case it generally acts in less than 20 minutes.

ERGOT, Ethereal Tincture of.—Powdered ergot, 15 ounces; ether, 2 pints; macerate 7 days; express and strain. Dose—15 to 60 drops, according to the object in view.

ERGOT, Tincture of.—Powdered ergot, 8 ounces; proof spirit, 2 pints; macerate 14 days; strain, express and filter. Dose—15 drops to 2 drachms, as required.

ERGOT, To Preserve.—Ergot is injured from being eaten by a minute insect of the *acarus genus*, that appears to have a liking for damaged rye, among, perhaps, many other things to it not less palatable. As it has an aversion to many pungent things, it may be kept away by putting in the vessel containing the ergot a few drops of the oil of cloves, or a few cloves themselves, or seeds of cardamons, or camphor, etc. If well dried before corking it up, by treating it after this manner it may be preserved for a long time, probably several years.

ELDER.—An infusion of elder flowers is good for feverishness and sore mouth in children; add a pint of boiling water to a table-spoonful of the flowers.

The inner bark, with cream, fresh butter, or sweet oil, makes a nice cooling ointment for burns, and other inflamed sores.

ELIXIR, Anti-scorbutic, for the Teeth.—Cinchona, 3 ounces; guaiacum, 5 ounces; pellitory 3 ounces; orange peel, 2 drachms; cloves, 5 drachms; saffron, half a drachm; benzoin, 2 drachms; spirits of wine or brandy, 32 ounces; digest and filter.

ELIXIR, REED'S, for the Teeth.—Fresh roots of horse-radish, fresh leaves of scurvy grass and mint, each 6 drachms; guaiacum, cinchona, pellitory, calamus, and rhatany, each 5 drachms; proof spirits, 1 quart; macerate for 16 days, and strain.

ELIXIR, ODONTALGIC.—Pellitory root, 2 ounces; simple spirits of lavender, 16 ounces; muriate of ammonia, half a drachm; digest 24 hours and filter.

ELIXIR OF ROSES, for the Teeth.—Cloves, 1 drachm; cinnamon, 3 ounces; ginger, 2 ounces; spirits of wine, 2 pints; oil of orange, 1 drachm; otto of roses 15 drops; essence of peppermint, 1 ounce. Mix. Digest 15 days, and filter.

ELIXIR of Pyrophosphate of Iron and Bark.—Pyrophosphate of iron 128 grains, simple syrup 2 ounces, water 6 ounces, tincture of bitter orange peel 2 ounces, alcohol, dilute, 6

ounces, sulphate of quinia 6 grains, sulphate of cinchona 3 grains, sulphate of quindia 3 grains. Put the water, pyrophosphate of iron, and half an ounce of the simple syrup into a pint bottle, and shake occasionally till the pyrophosphate of iron is dissolved. Into another pint bottle put the diluted alcohol, tincture of bitter orange peel, and the sulphates of quinia, cinchona, and quindia, and shake occasionally till these salts of bark are dissolved—then add the whole to the bottle containing the pyrophosphate of iron, and shake till mixed, after which filter through paper, and add the remainder of the syrup; mix by shaking, and the preparation is ready for use.

ELIXIR OF CALISAYA BARK AND IRON.—Take calisaya bark in powder 4 ounces, Cinnamon water 2 pints, caraway water 1 pint, tincture of orange peel $\frac{1}{2}$ a pint, alcohol $\frac{1}{2}$ a pint, brandy 2 pints, syrup 3 pints, soluble pyrophosphate of iron 2 ounces. Mix the cinnamon and caraway waters with the tincture of orange peel, and percolate the bark with the mixture. Dissolve the pyrophosphate of iron in the percolate, add the other ingredients, and filter. This contains about 1 grain of pyrophosphate of iron and 2 grains of cinchona bark to a drachm.

ESSENCE of Bitter Almonds.—Essential oil of almonds 1 part, and rectified spirit 20 parts. Used to flavor wine, cordials, liquors, perfumery, pastry, etc. It is poisonous in large quantity, and, having a strong taste, very little serves to impart flavor.

ESSENCE of Lavender.—Essential oil of lavender 3 ounces, rectified spirit 2 quarts, rose water half a pint, tincture of orris half a pint.

ESSENCE of Roses.—1. Otto of roses 7 drachms, spirit 1 gallon. Mix.—2. Rose leaves 4 parts, water 12 parts. Distill off one-half. When a sufficient quantity of this water has been obtained, it must be used as water upon fresh rose leaves, and the same process must be repeated to the fourth, fifth, or even the sixth time, according to the quality desired.

ESSENCE of Neroli.—Spirits of wine half a pint, orange peel, cut small, 3 ounces, orris root, in powder, 1 drachm, musk 2 grains. Let it stand in a warm place for 3 days, and filter.

ESSENCE of Rondelette.—Spirit (brandy, 60 o. p.) 1 gallon, otto of lavender 2 ounces, otto of cloves 1 ounce, otto of roses 3 drachms, otto of bergamot 1 ounce, extract of musk, vanilla and ambergris each $\frac{1}{4}$ pint. The mixture must be made at least a month before it is fit for use.

ESSENCE of Musk.—1. Bladder musk, cut small, 5 parts, civet 1 part, spirit of ambrette 100 parts, strongest alcohol, 35 parts. Put them into a close vessel, and digest for a time in a heat of from 100 to 150° Fahrenheit.—2. Grain musk 2 drachms; alcohol, 1 lb. Mix. As before.

ESSENCE of Peppermint.—Oil of peppermint 1 ounce, rectified spirit 1 ounce, carbonate of magnesia half an ounce, water 7 ounces. Mix the oil and magnesia intimately, put them in the filter, pour on the spirit, and afterwards the water. Mixes with water; it may be filtered again if not quite clear.

ESSENCE OF VIOLETS.—1. Orris root, 2 ounces; rectified spirit, 8 ounces; digest, express and filter, or proceed by percolation.—2. Alcoholic extract of cassie 1 pint, esprit de rose, tincture of orris and of tuberose, of each half a pint, oil of almonds, 3 drops.

ESSENCE of Verbena.—1. Oil of verbena, 1 drachm; rectified spirit, 1 ounce; mix, and add essence of vanilla, 10 drops.—2. Oil of lemon-grass, 3 drachms; of lemon peel, 2 ounces; of orange peel, 4 drachms; spirit 1 pint; mix and filter.

ESSENCE for Smelling Bottles.—Essence of ambergris, 1 ounce; otto of roses and oil of lavender, of each 20 drops; essence of bergamotte, 2 drachms; mix, and add 5 ounces of the strongest solution of ammonia. Fragrant and refreshing.

ESPRIT DE BOUQUET.—Oil of lavender, oil of cloves, and oil of bergamotte, each 2 drachms; otto of rose and oil of cinnamon, each 20 drops; essence of musk, 1 drachm; rectified spirits, 1 pint. Mix.

ETHER, ACETIC.—Take strong alcohol, 3 parts; acetate of potass, 3 parts; concentrated sulphuric acid, 2 parts. Mix and distill; then take of the product 4 parts, and sulphuric acid 1 part, and draw over a quantity equal in weight to the alcohol employed.

EXTRACTS, TO MAKE.—Take of the plant, root or leaves you wish to make the extract from, any quantity; add sufficient water, and boil them gradually; then pour off the water, and add a second quantity; repeat the process until all the virtue is extracted, then mix the several decoctions, and evaporate at as low a temperature as possible, to the consistence of an extract. Extracts are better made in a water bath, and in close vessels, and for some very delicate articles, the evaporation may be carried on at a very low temperature, in a vacuum, by surrounding the vessel with another containing sulphuric acid. Manufacturing druggists usually add to every 7 lbs. of extract 4 ounces of gum arabic, 1 ounce of alcohol, and 1 ounce of olive oil. This mixture gives the extract a gloss and keeps it soft.

EXTRACT OF BUCHU.—Buchu leaves 1 lb., boiling distilled water 3 gals.; boil the leaves in 2 gals. of the water down to 6 quarts; then boil it again in the remaining water till reduced to 2 quarts. Evaporate the mixed liquor down to 6 quarts, and add 1 quart of strong sage tea, 2 drachms of bicarbonate of potassa, 2 drachms of cannabis indica, 5 ounces of rectified spirit, 2 ounces of balsam copaiba and Harlem oil; then bottle.

EXTRACT OF ELDERFLOWERS, for the Complexion.—Take gum benzoin 1 drachm, a wine-glassful of spirits of wine, and 1 pint of elder-flower water. Powder the gum, and put it into the spirit. In a short time it will be dissolved. Now put this mixture into a jug, and then gradually add the elder-flower water. If there be any particles of benzoin not dissolved, the extract must be strained through fine muslin prior to its being put into the toilet bottle. On account of the milky appearance of this preparation, the French perfumers call it *lait virginal*.

EXTRACT OF OPIUM.—Opium sliced $1\frac{1}{2}$ lbs., distilled water 5 pints. Macerate the opium in $\frac{1}{2}$ the water for 24 hours, frequently stirring; then strain, macerate for 24 hours in the remaining water, and strain and evaporate the mixed liquors to an extract. Used as a mild preparation of opium. Dose—1 to 6 grains.

EXTRACT OF POPPY.—Poppies bruised and freed from the seeds 15 ounces, boiling dis-

tilled water 1 gallon; macerate for 24 hours, boil to 4 pints, strain while hot, and evaporate to an extract. Anodyne narcotic. Dose—2 to 20 grains.

EXTRACT OF SARSAPARILLA, Fluid.—Sliced sarsaparilla $3\frac{1}{2}$ lbs., boiling distilled water 5 gallons, rectified spirit, 2 ounces. Boil the sarsaparilla in 3 gallons of water to 12 pints, and strain. Evaporate the mixed liquors to 18 ounces, and when cold add the spirit. Dose—1 to 2 drachms, or more.

EXTRACT OF SENNA, Fluid.—Senna, 15 lbs. av., boiling water, q. s.; concentrate the infusion to 10 lbs. av., dissolve in it 6 lbs. of thick treacle, add 24 fluid ounces of rectified spirit, and water sufficient to make 15 pints. Dose—2 drachms. Each ounce represents 1 ounce of the senna.

EXTRACT OF VANILLA.—Take of vanilla in the pods 1 ounce, fine washed sand 1 ounce, 95 per cent. alcohol 3 ounces, 45 per cent. alcohol 13 ounces, syrup 2 drachms; cut the vanilla into short pieces and bruise well with the sand, then pack in a displacer; add first the strong and afterwards the diluted alcohol; after 24 hours filter.

FEBRIFUGE, for Fevers in General.—Carbonate of ammonia 2 drachms, alum 1 drachm, capsicum, foreign gentian, Colombo root, and prussiate of iron, all pulverized, of each $\frac{1}{2}$ a drachm; mix by putting into a bottle, and adding 4 ounces of cold water. Dose—1 teaspoonful to a grown person, every 2 hours, in common cases of fever. It may be sweetened, if preferred. Shake well each time before giving, and keep the bottle tightly corked.

FEBRIFUGE TEA.—Take Virginia snake-root and valerian root, of each 2 drachms, and of boiling water 1 pint. Pour the boiling water on the roots and steep $\frac{1}{2}$ an hour, and give a teaspoonful of the febrifuge and a tablespoonful of this tea together, every 2 hours, and after the patient has been 24 hours without fever, give it every 3 or 4 hours, until the patient has good appetite and digestion; then 3 times daily, just before meals, until the patient has gained considerable strength, when it may be entirely discontinued; or he may continue the simple infusion to aid digestion.

FEBRIFUGE WINE.—Quinine 25 grains, water 1 pint, sulphuric acid 15 drops, epsom salts 2 ounces, color with tincture of red sanders. Dose—A wineglassful 3 times per day. This is a world-renowned medicine.

FRENCH WHITE.—French white is levigated talc passed through a silk sieve. This is the best face-powder made, particularly as it does not discolor from action of the skin or impure atmosphere.

FLUID EXTRACT OF VANILLA.—Vanilla beans 4 ounces, sugar 2 ounces, alcohol 4 fluid ounces, simple syrup 4 ounces, brandy 1 pint. Cut the beans finely, and rub thoroughly with the sugar, put all together in a strong stone bottle; secure the cork with twine, and boil in a water-bath for $\frac{1}{2}$ an hour; then transfer to a percolator, and add brandy sufficient to make 4 pints.

FLUID, GERMAN RHEUMATIC.—Oils of hemlock and cedar, of each half an ounce, oils of origanum and sassafras, each 1 ounce, aqua ammonia 1 ounce, pulverized capsicum 1 ounce, spirits of turpentine and gum camphor, of each a

half ounce; put all into a quart bottle, and fill it with 95 per cent. alcohol.

FLUID, BOGLE'S HYPERION.—To 8 ounces of 90 or 95 per cent. alcohol, colored with red alkanet, add 1 ounce of castor oil; perfume with geranium and verbenia.

GARGLES.—Gargles are very simple remedies, and well suited to domestic practice in sore throats of various kinds. According to the nature of the ingredients of which they are made, they allay irritation and inflammation, invigorate the membrane lining the mouth and throat, and promote suppuration. The particular purpose for which they are required ought to be kept in view in their preparation.

GARGLE, For Inflamed Throat.—Purified nitre 2 drachms, barley water 7 ounces, acetate of honey 7 drachms. Mix the ingredients, and use frequently.

GARGLE, for Domestic Use.—3 teaspoonfuls of vinegar, 2 teaspoonfuls of tincture of myrrh, 2 of honey, a glass of port wine, and 3 or 4 wine-glasses of warm water; mix all these ingredients, and the gargle is ready for use. A decoction of the leaves of the currant may, with good effect, be added instead of the warm water. This makes both a pleasant and useful gargle.

GARGLE, MUCILAGINOUS, for Inflamed Throat.—Tincture of myrrh 2 drachms, mucilage of gum Arabic 7 ounces. Mix. This gargle is of use in defending the parts when the saliva is of an acrid character.

GARGLE, to Promote Suppuration.—Barley water and infusion of linseed. This gargle is to be used warm. It must be kept in view that this mild gargle acts by softening the parts of the throat, and hastening the suppuration by its heat—it is requisite, therefore, that the temperature of the gargle be kept up.

CHEWING GUM.—Take of prepared balsam of tolu 2 ounces, white sugar 1 ounce, oatmeal 3 ounces. Soften the gum in a water bath, and mix in the ingredients; then roll in finely-powdered sugar or flour to form sticks to suit.

GLYCERINE.—Glycerine is derived from a residuum left after the making of soap and stearine candles, and which for ages was considered of no value. The medicinal properties of glycerine are of the most striking kind, but it is not valuable in pharmacy only; its antiseptic properties are marvelous. It is capable of preserving animal substances from decay; leather is preserved by it in a soft and pliable condition; wooden vessels saturated with it neither shrink nor dry up; it is used for extracting the odor of flowers, and is of great value in the processes of dyeing, brewing, liqueur making and wine keeping; its power in healing sores and removing pains, such as ear-ache, is wonderful. With nitric acid it forms nitro-glycerine, a substance whose explosive force is many degrees greater than that of gunpowder.

GLYCONINE.—This is the name of a new glycerine preparation, which is recommended as a healing ointment for wounds, and broken surfaces of all kinds, erysipelas, cutaneous affections—of which it allays the itching—as it forms a sort of varnish over the skin, and thus excludes the air. For its preparation 5 parts of glycerine are mixed with 4 parts of the yolk of eggs. It has the consistency of honey, feels like salve, and is not changed in the air.

DYES, HAIR.—Hair dyes color the hair only

as far as the roots, and require to be applied as frequently as the growth of hair shows both the false and real color. 1. *Dr. Hanman's.*—Litharge half an ounce, quicklime 3 ounces, starch 2 ounces; mix in powder. For use, mix in warm water, and rub on the hair to the roots. Cover the hair with oil-skin or wadding for the night.

—2. *Oryfil's.*—Litharge 6 parts, quicklime 5 parts, starch 1 part; mix and apply as above.

—3. *Spencer's.*—Sap green half a drachm, nitrate of silver 1 drachm, hot water 1 ounce; dissolve.

Combed in the hair for use.—4. *Chevalier's.*—Mix 5 drachms of fresh-slaked lime with 2 ounces of water; strain and bottle. Dissolve 5 drachms of acetate of lead in water, add enough slaked

lime to saturate the acetic acid, wash the precipitate, and mix it with the milk of lime.—5. *Warren's.*—Lime 4 ounces, white $\frac{1}{2}$ an ounce, litharge 1 drachm; mix in powder.

Used with a sponge and water, to dye black, or with milk to dye brown.—*Delcroix's.*—Acetate of lead 2 ounces, prepared chalk 3 ounces, quicklime 4 ounces.

As No. 1.—7. *Gen. Twigg's.*—1 drachm of sulphur, $\frac{1}{2}$ a drachm of sugar of lead, 4 ounces of rose water. Mix them well; shake the phial on using it, and bathe the hair twice a day for a week or longer if necessary.

It does not dye the hair, but seems to restore the original color.—8. *Batchelor's.*—No. 1. To 1 ounce of gallic acid, dissolved in 8 ounces of alcohol,

add $\frac{1}{2}$ a gallon of soft water.—To 1 ounce of nitrate of silver, dissolved in 1 ounce of concentrated ammonia and 3 ounces of soft water, add 1 ounce of gum Arabic and 4 ounces of soft water.

HAIR DYES, Lead in.—There is no doubt that the lead which forms so large a part of the various hair dyes in general use is injurious, if not actually dangerous, to the system.

Head-ache, neuralgia, paralysis, etc., have in numberless cases been caused by the use of lead preparations for the hair, and for this reason they should never be used.

Gray hairs, whether on the head of a middle-aged or old person, are invariably becoming, and are, or should be, "a crown of glory."

Another objection to the dyeing of the hair is, that it can be detected by the most casual observer, and, in fact, deceives no one.

HAIR INVIGORATOR.—1. Take bay rum 1 pint, alcohol $\frac{1}{2}$ a pint, castor oil 1 ounce, carbonate of ammonia $\frac{1}{4}$ of an ounce, tincture of cantharides $\frac{1}{4}$ of an ounce. Mix, and shake when used.

To be used daily.—2. Vinegar of cantharides 1 ounce, Cologne water 1 ounce, and rose water 1 ounce, mixed and rubbed to the roots of the hair, until the scalp smarts, twice daily, has been very highly recommended for bald heads, or where the hair is falling out.—3.

Carbonate of ammonia 1 ounce, rubbed up in 1 pint of sweet oil. Apply daily until the hair stops falling out, or is sufficiently grown out.—4.

Strong sage tea, as a daily wash, will be found to promptly stop the hair from falling out, and, if its use is persevered in, it will make it grow thick and strong.

HAIR RESTORATIVES.—*Mrs. Allen's.*—To 16 ounces of rose water, diluted with an equal part of soft water, add $\frac{1}{4}$ of an ounce of sulphur and $\frac{1}{4}$ of an ounce of sugar of lead; let the compound stand 5 days before using.—

Wood's.—Take 4 drachms of lac sulphur, 2 of sugar of lead, and 1 pint of rose water; mix.

—*Phalon's*.—To 8 ounces of 90 per cent. alcohol, colored by a few drops of tincture of alkanet root, add 1 ounce of castor-oil, and perfume with a compound of bergamotte, neroli, verbenia, and orange.

HAIR, Saponaceous Wash for the.—Rectified spirit 1 pint, rose water 1 gallon, extract of rondeletia $\frac{1}{2}$ a pint, transparent soap $\frac{3}{4}$ of an ounce, hay saffron $\frac{1}{4}$ of a drachm. Shave up the soap very fine; boil it and the saffron in a quart of the rose water; when dissolved, add the remainder of the water, then the spirit, and finally the rondeletia, which is used by way of perfume. After standing for 2 or 3 days, it is fit for bottling.

HAIR WASH, Rosemary.—Rosemary water 1 gallon, spirit 10 ounces, pearlsh 1 ounce.

HOREHOUND.—A bitter pectoral herb, used mostly in syrup or candy. The syrup is made by adding 1 lb. of good lump sugar to each pint of a strong infusion; the candy, with 10 lb. of lump sugar to each pint, and boiling until it will candy on cooling. Used in severe coughs and colds.

HORSE-RADISH.—This is an anti-scorbutic and stimulating medicine. It may be taken either in substance or infused in wine, for the scurvy, dropsy, palsy, chronic rheumatism, and like affections.

HYDROGEN GAS, An Improved Method of Producing.—Alkaline and earthy alkaline hydrates, such as the hydrate of potash, soda, strontium, baryta, chalk, etc., mixed with charcoal, coke, anthracite, pit-coal, peat, etc., and heated to a red heat, are decomposed into carbonic acid and hydrogen without further loss of heat than that due to the production of the carbonic acid and hydrogen. The hydrates of potash, soda, etc., and more especially the hydrates of chalk or lime, decomposed by the coal into hydrogen and carbonic acid, can be used indefinitely in this process, provided they are moistened each time with water, so as to reproduce the decomposed hydrates. In this operation the hydrogen gas is generated without any special production of steam, and may thus be produced without any other generating apparatus than the retorts themselves. These retorts, not being exposed to the direct action of the steam, are not subject to any interior alteration or damage. It follows, therefore, that the hydrogen gas produced by the decomposition of the above-named hydrates, by means of carbon, can be generated at a very small cost, and with the same facility as carburetted hydrogens, from the distillation of pit-coal or other organic hydrocarbon matter. These alkaline and earthy alkaline hydrates may be mixed with the different mineral or vegetable combustibles, either in a definite chemical proportion, or without a fixed or determinate proportion, and in any suitable distilling or heating apparatus, in order to produce, when heated to a red heat, hydrogen gas for illuminating and heating purposes. The advantage of the production of hydrogen as cheaply as oxygen, and which has been obtained, is likely to create a revolution in many industries, and especially in metallurgy. A cheap method of producing a great heat in order to reduce metals, such as platinum, gold, silver, and iron, has long been sought for in Europe, where the oxyhydric blow-pipe is now used to melt the platinum in a calcium crucible. By this discovery it becomes possible to obtain any immense heat which may

(and this is a most important point) be regulated by a simple tap.

ICE, CAMPHOR.—Melt of spermaceti 1 drachm, with almond oil 1 ounce, and add of powdered camphor 1 drachm.

IRON, Bitter Wine of.—Citrate of iron 128 grains, extract of calisaya 16 grains. Hot water, sugar, and tincture of orange peel to flavor, and sherry wine to make 1 pint. Dissolve the citrate of iron and extract of cinchona separately in hot water, adding a small excess of citric acid; then add the sugar and tincture of orange peel, and lastly the wine.

INFUSION OF BUCHU.—Buchu 1 ounce, boiling distilled water 1 pint. Macerate for 4 hours in a tightly-closed vessel, and strain. Used in affections of the bladder or urinary organs. Dose—1 to 2 ounces, generally combined with alkalies, as liquor potassa, etc.

INCENSE.—Powdered cascarilla 2 ounces; myrrh, styrax, benzoin, and Burgundy pitch, of each 1 ounce.

IODINE, Stains of.—By adding a few drops of liquid carbolic acid to the iodine tincture, the latter will not stain. Carbolic acid also renders the efficacy of tincture of iodine more certain. The following formula is recommended whenever injections of the latter are indicated: Alcoholic tincture of iodine 45 drops, pure liquid carbolic acid 6 drops, glycerine 1 ounce, distilled water 5 ounces. In blenorhea and leucorrhoea this mixture is said to be much superior to tar water.

KATHAIRON for the Hair.—(Lyon's.) 2 gallons of castor oil, and 3 gallons of alcohol. Mix first 10 ozs. of tincture cantharides, (official,) 12 ounces oil of bergamotte; dissolve in a small quantity of alcohol. Tincture of red sander—proportions say 1 lb. to 5 gallons, 95 per cent. alcohol to suit—4 ounces color 30 gallons.

KALYDOR, for the Complexion.—Take of blanched bitter almonds 1 part, and rose-water 16 parts. Mix and strain, then add 5 grains of bichloride of mercury to every 8 ounces of the mixture, and scent with rose or violet.

LARD, To Prepare Pure.—Take good white lard, and melt it in a water bath; then put it into water, and agitate them well together to wash out all the salt; let them cool, and then collect the lard from the top of the water, drain it, melt it again in a water bath, let it remain melted for $\frac{3}{4}$ of an hour, and lastly pour off the clearest portion, and be careful to preserve it from the air.

LAUDANUM.—Take best Turkey opium 1 ounce; slice it, and pour upon it 1 gill of boiling water, and work it in a bowl or mortar until it is dissolved; then pour it into the bottle, and with half a pint of 76 per cent. alcohol, rinse the dish, adding the alcohol to the preparation, shaking well, and in 24 hours it will be ready for use. Dose—From 10 to 30 drops for adults, according to the strength of the patient or the severity of the pain. 30 drops of this laudanum will be equal to 1 grain of opium.

LEECHES.—Leeches are best preserved in clean rain or pond water; in spring water they soon die. The water should not be changed too often; once each week in summer, and once each month in winter, being sufficient, unless it becomes foul. Leeches, when applied, do not probe the skin like a lancet-point, but act by a

saw-like motion until the skin is pierced; they then suck, if undisturbed, until the cecal pouches are full, and finally drop off. A little salt is usually sprinkled on to cause them to disgorge the blood, and they are gently pressed between the fingers to facilitate this effect. When leeches do not readily bite, means are used to induce them. The skin in all cases should be well washed and dried, and the leech gently dried in a soft cloth; it may then be put in a pill-box or wine-glass, which is pressed on the part to be operated on. When they do not yet bite, a small puncture should be made with a lancet, to draw blood, and they will then mostly take hold. This mode is also used when the spot to be drawn from is near the eye, etc.; or, if the leech is lively, it may be put in a large quill, and the head placed toward the part, while the thumb prevents its retreat at the opposite end. As the amount of blood drawn by leeches is not large, hot poultices or fomentations are applied to increase the discharge, or the cupping-glasses may be used. When sufficient is drawn, the bites mostly close without much attention, but in some rare cases they are very troublesome; they then should be pressed with lint soaked in a solution of alum or the tincture of sesquichloride of iron, or a fine point of nitrate of silver should be inserted a minute distance. If the bleeding still continues, the skin must have a needle passed through the edges, and silk twisted round it.

LIME-JUICE AND GLYCONINE.—Lime or lemon-juice $\frac{1}{2}$ a pint; heat in a porcelain mortar to near the boiling point, and add gradually rose water, elder-flower water, and rectified spirits, of each 2 ounces. Agitate the whole well together. After 24 hours' repose, decant or filter through calico or muslin, then add of pure glycerine $2\frac{1}{2}$ ounces, and oil of lemons $\frac{1}{2}$ a drachm. Again agitate them together for some time, and by careful manipulation you will have a somewhat milky liquid; but it should be quite free from any coarse floating matter or sediment.

LINIMENTS.—A liniment is a semi-fluid ointment, found or supposed to be useful in painful joints, swellings, burns, etc. It is generally applied by rubbing on with the hand, or a flannel, and sometimes both, the flannel being used first to irritate the skin. There are many who have come to the conclusion that the rubbing is more beneficial than the liniment.

LINIMENT, Arnica.—Add to 1 pint of sweet oil 2 tablespoonfuls of tincture of arnica; or the leaves may be heated in the oil over a slow fire. Good for wounds, stiff joints, rheumatism, and all injuries.

LINIMENT, Chilblain.—1 ounce of camphorated spirit of wine, $\frac{1}{2}$ an ounce of the subacetate of lead, (liquor.) Mix, and apply 3 or 4 times a day.

LINIMENT, Camphor.—Rectified spirits 17 fluid ounces, strong water of ammonia $2\frac{1}{2}$ oz., camphor 2 ounces, oil of lavender 5 drops.

LINIMENT, Electro-Magnetic.—Best alcohol 1 gallon, oil of amber 8 ounces, gum camphor 8 ounces, castile soap shaved fine 2 ounces, beef's gall 4 ounces, ammonia 3 F.'s strong 12 ounces; mix, and shake occasionally for 12 hours, and it is fit for use.

LINIMENT, Good Samaritan.—Take of 98 per cent. alcohol 2 quarts, and add to it the following articles: Oils of sassafras, hemlock,

spirits of turpentine, tinctures of cayenne, catechu, guaicaci, (guac,) and laudanum, of each 1 ounce; tincture of myrrh 4 ounces, oil of origanum 2 ounces, oil of wintergreen $\frac{1}{2}$ ounce, gum camphor 2 ounces, and chloroform $1\frac{1}{2}$ ounces.

LINIMENT, Rheumatic.—Olive oil, spirits of camphor, and chloroform, of each 2 ounces; sassafras oil 1 teaspoonful. First add the oil of sassafras to the olive oil, then the spirits of camphor, and shake well before putting in the chloroform, shaking when used, keeping it corked, as the chloroform evaporates very fast if it is left open. Apply 3 or 4 times daily, rubbing it well, and always toward the body.

LINIMENT, Sore Throat.—Gum camphor, 2 ounces, castile soap shaved fine 1 drachm, oil of turpentine 1 tablespoonful, oil of origanum $\frac{1}{2}$ an ounce, opium $\frac{1}{4}$ of an ounce, alcohol 1 pint. In a week or 10 days it will be fit for use; then bathe the parts freely 2 or 3 times daily until relief is obtained.

LINIMENT for Spinal Affections.—Take a pint bottle and put into it oil of origanum, wormwood, spirits of turpentine, and gum camphor, of each 1 ounce, and fill it with the best alcohol.

LIP-SALVE, Carnation.—Olive oil 1 lb., alkanet root 1 ounce or less. Macerate with heat until the oil is well colored; then add of white wax 6 ounces, spermaceti 6 ounces, oil of lavender 30 drops, essence of bergamotte 1 drachm.

LIP-SALVE, Red.—1. Olive oil 1 lb., alkanet root 2 ounces or less. Macerate with heat until the oil is well colored; then add of spermaceti 2 ounces, white wax 8 ounces, suet (prepared) 12 ounces. When nearly cold stir in orange-flower water 1 ounce, oil of lavender $\frac{1}{2}$ a drachm.—2. Prepared suet 1 lb., prepared lard 1 lb., alkanet root 2 ounces. Macerate in a gentle heat until sufficiently colored, then cool a little, and stir in of rose water 6 ounces, oil of lavender 10 drops, essence of neroli 10 drops, essence of lemon 10 drops, essence of bergamotte 10 drops.

LIP-SALVE, White.—1. Prepared suet 1 lb., prepared lard 1 lb. Melt, and when cooling stir in rose water 4 ounces, oil of rhodium 2 drops, oil of cloves 5 drops—or other scent to taste.—2. Olive oil 1 lb., spermaceti 1 lb., white wax 1 lb., prepared lard 1 lb. Melt, and while cooling stir in rose water 8 ounces, essence of lemon 2 drachms, bergamotte 2 drachms.

LIQUID BLUE, To Prepare.—Take of pure Prussian blue 1 part, and gradually add 2 parts of concentrated hydrochloric acid. Leave the paste to stand for 24 hours, and then add 9 parts of water, and bottle it.

LOTION, GONLAUD'S.—Blanched bitter almonds 1 ounce, blanched sweet almonds $\frac{1}{2}$ an ounce; beat to a paste, add pure water 1 pint; mix well, strain through a piece of coarse cloth, put it into a bottle, and add of corrosive sublimate in powder 10 to 12 grains, dissolved in a teaspoonful or two of spirit of wine, and shake well. Used as a cosmetic to improve the complexion, and also as a wash for obstinate eruptions.

LOTION, FRECKLE.—Muriate of ammonia 1 drachm, spring water 1 pint, lavender water 2 drachms; apply with a sponge 2 or 3 times a day.

LOTION of Chlorinated Soda.—This lotion is used for purifying the breath, cleansing the mouth, removing unpleasant odors, etc. Liquid chlorinated soda 1 ounce, distilled water about 19 ounces. Mix. A teaspoonful in a glass of water.

LOTION for Itching Chilblains.—Take hydrochloric acid 1 part, and water 8 parts. Mix. Apply on going to bed. This must not be used if the skin is broken.

LOZENGES, Carminative.—Bicarbonate of soda 2 drachms, refined sugar 14 ounces, oil of peppermint 4 drops; made into lozenges with mucilage of tragacanth. Used in flatulency, heartburn, etc.

LOZENGES, Cough.—1. Extract of blood-root, licorice, and black cohosh, of each $\frac{1}{4}$ of an ounce; tinctures of ipecac and lobelia, with laudanum, of each $\frac{1}{4}$ of an ounce; cayenne, powdered, 10 grains; pulverized gum arabic and starch, of each $\frac{1}{4}$ of an ounce; mix all together, and add pulverized sugar 3 ounces. If this should be too dry to roll into lozenges, add a thick solution of gum arabic to give it that consistency; and if it should be yet too moist, at any time, add more sugar. Divide into 320 lozenges. Dose—1 lozenge 3 to 6 times daily, as needed.—2. *Keating's*.—Lactucarium 2 drachms, ipecacuanha 1 drachm, squills $\frac{3}{4}$ drachm, extract of licorice 2 drachms, sugar 6 ounces. Made into a mass with mucilage of tragacanth, and then to be divided into twenty-grain lozenges for use.

LOZENGES, Ginger.—Take 8 lbs. of loaf sugar in fine powder, and 8 ounces of the best ground ginger. Mix them into a paste with dissolved gum. If gum tragacanth be preferred, the proportion is 1 pint of water to 1 ounce of gum; when properly dissolved, it must be forcibly passed through the interstices of a coarse towel or cloth. 1 ounce of this dissolved gum is sufficient for 4 or 5 lbs. of sugar; or 1 ounce of dissolved gum Arabic to 12 ounces of sugar. Essence may be used instead of powdered ginger, coloring it with saffron. A stimulant and stomachic.

LOZENGES, Santonin.—Santonin 60 grains, pulverized sugar 5 ounces, mucilage of gum tragacanth sufficient to make it into a thick paste, worked carefully together, that the santonin shall be evenly mixed throughout the whole mass; then cover up the mortar in which you have rubbed them, and let it stand from 12 to 14 hours to temper, at which time they will turn out better than if done immediately; divide into 120 lozenges. Dose—For a child 1 year old 1 lozenge night and morning; for a child 2 years old, 2 lozenges; for a child of 4 years old, 3 lozenges; for a child of 8 years old, 4 lozenges; for a child of 10 years old, or more, 5 to 7 lozenges; in all cases to be taken twice daily, and continuing until the worms start on a voyage of discovery.

LOZENGES, Steel.—Sugar 2 lbs., starch 1 lb., carbonate or oxide of iron 6 ounces, powdered cassia 5 ounces. Mix with mucilage.

MANDRAKE, or May Apple.—This is an excellent purgative, in doses of from 10 to 30 grains, or double that quantity, in a gill of water; or equal quantities of the mandrake juice and molasses may be mixed, and a tablespoonful taken every hour or two till it operates. The Indians gather the root in autumn, when the

leaves turn yellow, dry it in the shade, and pulverize it for use.

MILK OF ALMONDS.—Take of blanched Jordan almonds 1 ounce, blanched bitter almonds 2 drachms, distilled water $\frac{1}{2}$ a pint. Make an emulsion with them, then strain and add gradually corrosive sublimate (in coarse powder) 15 grains, previously dissolved in $\frac{1}{2}$ a pint of distilled water. If necessary add as much more water as will make the whole measure about 1 pint.

MILK OF ROSES.—In making the milk of roses, the chief object should be to produce a perfect emulsion, or one at least which, if it separates after long repose, may be restored to a homogeneous state by slight agitation. It must also be recollected that, though other perfumes may be and are commonly added to it almost at will, the scent of roses should predominate and form its characteristic one.

MILK OF WAX.—White wax and alcohol equal parts. Mix with heat in a porcelain vessel, then pour it on a slab, grind to a paste with more alcohol, and as soon as it appears of a perfectly even consistence, add water gradually to the amount of 3 or 4 times the weight of the wax; grind to a fine emulsion, and strain through canvass.

MIXTURE, COUGH.—Take 1 teacupful of molasses, and add 2 tablespoonfuls of vinegar; simmer this over the fire; then, when taken off, add 3 teaspoonfuls of paregoric, and as much refined nitre as can be put upon the point of a small breakfast knife. Of this mixture take 2 or 3 teaspoonfuls on going to bed, and 1 or 2 during the day when you have a disposition to cough.

MIXTURE, Copaiba.—Balsam of copaiba $1\frac{1}{2}$ ounces, nitric ether 1 ounce, tincture of henbane 3 drachms, liquor of potash 2 drachms, cinnamon water sufficient to make the mixture 8 ounces. Dose—2 tablespoonfuls twice a day in case of gonorrhea.

MIXTURE, Gout.—Wine of colchicum 1 ounce, spirit of nitrous ether 1 ounce, iodide of potassium 2 scruples, distilled water 2 ounces. Mix. A teaspoonful in chamomile tea 2 or 3 times a day.

MISTURA Spiritus Vini Gallici.—Best brandy and cinnamon water, of each 4 fluid ounces; the yolks of 2 eggs well beaten; loaf sugar $\frac{1}{2}$ an ounce; oil of cinnamon 2 drops; mix. Dose—From $\frac{1}{4}$ to 1 fluid ounce, as often as required. This makes both eat and drink. Of course any other flavoring oils can be used, if preferred, in place of the cinnamon.

NITRATE OF SILVER.—Pure silver $1\frac{1}{4}$ ounces, nitric acid 1 ounce, diluted with 2 ounces of water; heat by a sand-bath until ebullition ceases and the water is expelled; then pour into moulds. Must be kept from the light.

ODOR OF FLOWERS, To Obtain the.—The method pursued in the south of France, by which all the better qualities of pomatum are obtained, consists in the preparation of a pure fat or lard, and in impregnating this with the odoriferous principles of the flowers. The purifying of the lard has to be done with the utmost care, as almost everything depends on it. The lard is for this purpose washed on an inclined board with water, rubbing and working it all the while by means of a smooth, large stone, until the water runs off pure and clear. This

fat is then filled into shallow pans on which are thrown the flowers freshly cut; they are removed after 12 or 24 hours and replaced by fresh ones, until the lard is considered saturated. The pomatum is then filled into pots or bottles, and the bottles are tightly corked. If the fat is slightly rancid, a very much larger amount of flowers is required to render it fragrant, and the odor never attains that fineness and delicacy that it does with pure lead.

OIL, ESSENTIAL, To Extract from Flowers.—Take any flowers desired, which stratify with common salt, and put them in a clean earthen glazed pot. When thus filled to the top, cover it well and carry it to the cellar. 40 days afterwards put a crape over a pan, and empty the whole to strain the essence from the flowers by pressure. Bottle the essence and expose it 4 or 5 weeks in the sun, and dew of the evening, to purify. A single drop of this essence, if rightly prepared, is enough to perfume a quart of water.

OIL, BRITISH.—Linseed and turpentine oils of each 2 ounces, oils of amber and juniper of each 4 ounces, Barbadoes tar 3 ounces, seneca oil 1 ounce. Mix.

OIL OF HARLEM.—Sublimed or flowers of sulphur and oil of amber of each 2 ounces, linseed oil 1 lb., spirits of turpentine sufficient to reduce all to the consistence of thin molasses. Boil the sulphur in the linseed oil until it is dissolved, then add the oil of amber and turpentine.

OIL, HAIR, (Rosemary.)—Take castor oil 1 pint, sweet oil $\frac{1}{2}$ pint, lard oil $\frac{1}{4}$ pint, alcohol a tablespoonful. Perfumed with rosemary.

OIL, HAIR.—(Phalon's.) Coconut oil, perfumed with oil of almonds.

OIL, Rowland's Macassar.—Take sweet oil 4 ounces, cantharides 30 drops, oil of rose 5 drops, oil of bergamotte and oil of lemon of each 30 drops, and alkanet sufficient to color it.

OILS, KING OF.—Burning fluid 1 pint, oils of cedar, hemlock, sassafras and origanum of each 2 ounces, carbonate of ammonia pulverized 1 ounce; mix. To use—Apply freely to the nerve and gums around the tooth, and to the face in neuralgic pains, by wetting brown paper and laying on the parts—not too long, for fear of blistering; to the nerves of teeth by lint.

OIL OF CASSIA.—Finest oil of cloves 3 parts, ground cassia 1 part. Pour the oil warm on the cassia, macerate for 3 or 4 days or more, and then strain with expression.

OIL OF RHODIUM.—This oil is derived from a species of Rhodora; very fluid and limpid; pale yellow; soon darkens by age and exposure; tastes bitter and aromatic; has a modified odor of roses. Chiefly used as a substitute for otto of roses in cheap perfumery, and also to adulterate it. Oil of sandal wood is very frequently sold for it.

OIL OF ROSES, (for the Hair.)—Fine olive oil 1 pint, otto of roses 16 drops, oil of rosemary $\frac{1}{2}$ a drachm. If required to be red, color with alkanet root, and strain before adding the otto.

OIL OF ORANGE FLOWERS.—Orange flowers 1 part, blanched almonds bruised 2 parts, olive oil 1 part. Mix, and let them remain together for a week, then express the oil. More flowers may be used to increase the perfume, if desired.

OIL OF SPIKE.—The genuine oil of spike is made from the *lavendula spica*, (broad-leaved lavender,) but the commercial oil of spike is always made by taking the rock oil, and adding 2 ounces of spirits of turpentine to each pint.

OIL OF TURPENTINE, for Purifying Purposes.—However carefully the oil of turpentine may have been distilled, it always leaves after evaporation a disagreeable odor, firmly adhering to the goods that have been treated with it. The same is the case with benzine and the lighter petroleum oils. This may be obviated, according to Bremer, by distillation over tannin. Articles treated with oil of turpentine that has been distilled in this way, are heated to 150°, when they lose every trace of odor. Bremer adds that this preparation is less inflammable, cheaper, and more agreeable to the workman than benzine.

OIL CREAM, Cod Liver.—Pick out a $\frac{1}{4}$ of an ounce of nice, clean pieces of gum tragacanth, and steep them in a pint of water for 24 hours, stirring or shaking up occasionally so as to insure a fine, even mucilage. Now mix a pint of oil with a pint of this mucilage, and put them into a bottle capable of holding more than a quart, so as to give good "shaking room," and give a good shaking, until the particles of the oil are thoroughly divided. They cannot get together again, even if the mixture stands several days. To guard against any souring, add a teaspoonful of best brandy, and 1 or 2 drops of essence of lemon, almonds, vanilla, or whatever flavor is most desired. The brandy may be substituted by 20 drops of spirit of wine.

OINTMENT, CREAM.—Obtain a pint of pure cream, let it simmer over the fire till it resembles butter, and forms a thick, oily substance, which may be used as ointment for fresh or old wounds, cracked lips or hands.

OINTMENT, GREEN.—Honey and beeswax each $\frac{1}{2}$ a lb., spirits of turpentine 1 ounce, wintergreen oil and laudanum each 2 ounces, finely powdered verdigris $\frac{1}{4}$ of an ounce, lard 1 $\frac{1}{4}$ lbs.; mix by a stove fire, in a copper kettle, heating slowly.

OINTMENT, GLYCERINE.—Starch 3 parts, glycerine 10 parts. The starch, finely pulverized, is digested for about an hour with the glycerine, at the heat of a water-bath.

OINTMENT, Holloway's.—Take butter 12 ounces, beeswax 4 ounces, yellow resin 3 ounces. Melt, and add vinegar of cantharides 1 ounce; evaporate, and add Canada balsam 1 ounce, oil of mace 1 drachm, and balsam of Peru 15 drops.

OINTMENT, ITCH.—Sweet oil 1 lb., suet 1 lb., alkanet root 2 ounces. Melt and macerate until sufficiently colored, and then add powdered nitre 3 ounces, powdered alum 3 ounces, powdered sulphate of zinc 3 ounces, powdered vermilion sufficient to color, and oil of origanum sufficient to perfume.—2. Carbonate of potash 1 ounce, rose water 1 ounce, vermilion 1 drachm, sulphur 11 ounces, oil of bergamotte 1 drachm, lard 11 ounces. Mix.—3. Unsalted butter 1 lb., Burgundy pitch 2 ounces, spirits of turpentine 2 ounces, pulverized red precipitate 1 $\frac{1}{4}$ ounces; melt the pitch and add the butter, stirring well together; then remove from the fire, and when a little cool add the spirits of turpentine, and lastly add the precipitate, stirring the mixture until cold.

PRECIPITATE, RED, for Old Sores.—Red precipitate $\frac{1}{2}$ ounce, sugar of lead $\frac{1}{2}$ ounce, burnt alum 1 ounce, white vitriol $\frac{1}{4}$ ounce, or a little less; all to be very finely pulverized; have mutton tallow made warm 1 lb.; stir all in, and stir until cool.

OINTMENT, MARSHMALLOW.—Yellow resin and yellow wax each 56 lbs. Melt and reduce them to a proper consistence with rape oil, then add of thick mucilage 1 gallon; turmeric to color if required. Stir until it becomes cold.

OINTMENT, PILE.—Powdered nut-gall 2 drachms, camphor 1 drachm, melted wax 1 ounce, tincture of opium 2 drachms. Mix.

OINTMENT, SISSON'S.—Best brandy $\frac{1}{2}$ a pint, turpentine 1 gill, camphor gum 1 ounce, beef's gall $\frac{1}{2}$ a pint, neats-foot oil 1 pint; mix. Excellent for bruises or swellings of long standing.

OINTMENT, STRAMONIUM.—Take of the leaves of the stramonium, while yet green, about 1 bushel, and place them in a suitable iron kettle over a slow fire. Put in a few of the leaves at a time, washing them as you keep adding, until a pulpy mass results, when add lard 5 lbs., and stew to a crisp; then strain and box for use. Or take a drachm of the soft extract, and rub it into an ointment with 1 ounce of lard.

OINTMENT OF BELLADONNA.—Extract of belladonna 1 drachm, lard 1 ounce, and mix. Used to allay the pain of rheumatism, etc.

OPIUM, POWELL'S.—Take opium 1 part, spirit 9 parts. Macerate until the spirit will take up no more, decant, and reserve the tincture; then pour 6 parts of water on the residuum and repeat the process. Strain and mix the 2 solutions; next put them into a retort and distil over, spirit 9 parts, and evaporate the remainder to a proper consistence.

OPODELDOC, Liquid.—The best brandy, 1 quart; warm it and add gum camphor 1 ounce, sal ammoniac and oil of wormwood, of each $\frac{1}{4}$ ounce; oils of origanum and rosemary, of each $\frac{1}{2}$ an ounce; when the oils are dissolved by the aid of the heat, add 6 ounces of soft soap.

OTTO OF ROSES.—Fill a large glazed earthen jar with rose leaves, carefully separated from the cups; pour upon them spring water, just sufficient to cover them, and set the jar with its contents in the sun for 2 or 3 days, taking it under cover at night. At the end of the third or fourth day, small particles of yellow oil will be seen floating on the surface of the water, and which, in the course of a week, will have increased to a thin scum. The scum is the otto of roses; take it up with a little cotton tied to the end of a stick, and squeeze it into a phial.

OXYGEN, Method of Preparing.—Take a strong solution of chloride of lime, and gently heat it with only a trace of freshly prepared peroxide of cobalt; a stream of oxygen is thus evolved, and chloride of calcium is formed. The evolution of the gas is very regular when the liquid is heated to 70 or 80°. All the oxygen is given off, no chlorine being liberated. The chief point is to use a perfectly clear solution of chloride of lime; if a milky or thick solution be used, it will froth.

PAIN-KILLER, Perry Davis'.—Alcohol 1 quart, gum guaiac 1 ounce, gums myrrh and camphor, and Cayenne, (pulverized,) of each

$\frac{1}{2}$ ounce. Mix. Shake occasionally for a week or 10 days, and filter or let settle for use. Apply freely to surface pains, or it may be taken in teaspoon doses for internal pains, and repeat according to necessities.

PAIN EXTRACTOR.—Spirits of ammonia 1 ounce, laudanum 1 ounce, oil of organum 1 ounce, mutton tallow $\frac{1}{2}$ a lb.; combine the articles with the tallow when it is nearly cool.

PAREGORIC.—Best opium $\frac{1}{2}$ a drachm; dissolve it in about 2 tablespoons of boiling water; then add benzoic acid $\frac{1}{2}$ a drachm, oil of aniseed $\frac{1}{4}$ of a fluid drachm, clarified honey 1 ounce, camphor gum 1 scruple, 76 per cent. alcohol 11 fluid ounces, distilled water 4 fluid ounces, macerate (keep warm) for 2 weeks. Dose—For children 5 to 20 drops, adults 1 to 2 teaspoons.

PAPER, FUMIGATING.—Take sheets of light cartridge paper, and dip them into a solution of alum—say, alum 1 ounce, water 1 pint. After they are thoroughly moistened, let them be well dried; upon one side of this paper spread a mixture of equal parts of gum benzoin, olibanum, and either balm of Tolu or Peruvian balsam, or the benzoin may be used alone. To spread the gum, etc., it is necessary that they be melted in an earthenware vessel and poured thinly over the paper, finally smoothing the surface with a hot spatula. When required for use, slips of this paper are held over a candle or a lamp, in order to evaporate the odorous matter, but not to ignite it. The alum in the paper prevents it to a certain extent from burning.

PASTE, German.—Blanched sweet almonds 1 lb., pea-meal 2 lbs., butter 3 ounces, saffron 4 grains, the yolks of 2 eggs, honey sufficient to make a paste, which must be passed through a sieve. Used to feed larks, nightingales, and other insectivorous singing birds.

PASTE, Phosphorous.—Put into a Florence flask 1 drachm of phosphorous and 1 ounce of rectified spirits. Dip the flask into hot water until the phosphorous is melted, then cork the flask and agitate it until the contents are cold. Pour off the spirit, and mix the phosphorous with $1\frac{1}{4}$ ounces of lard, then add a mixture of flour 5 ounces, sugar or cheese $1\frac{3}{4}$ ounces, and make the whole into a paste with a little water. Used to destroy vermin.

PASTILES, Fumigating.—1. Benzoin 1 drachm, cascarilla $\frac{1}{4}$ of a drachm, myrrh 1 scruple, oils of nutmegs and cloves of each 10 drops, nitrate of potash $\frac{1}{4}$ of a drachm, charcoal 6 drachms; mix with mucilage of tragacanth.—2. Benzoin 2 ounces, balsam of Tolu and yellow sandal wood of each $\frac{1}{4}$ of an ounce, laudanum 1 drachm, nitre 2 drachms, charcoal 6 ounces; mix with mucilage of tragacanth.—3. Santal wood in powder 1 lb., gum benzoin 1 lb., gum Tolu $\frac{1}{4}$ lb., otto of Santal, cassia and cloves, of each 3 drachms; nitrate of potash 1 ounce, mucilage or tragacanth sufficient to make the whole into a stiff paste.

PASTILES, MOUTH, for Perfuming the Breath.—1. Chocolate powder and ground coffee each 1 ounce, prepared charcoal 1 ounce, sugar 1 ounce, vanilla (pulverized with the sugar) 1 ounce, and sufficient mucilage to mix. Make into lozenges of any form, 6 or 8 to be used every day to disinfect the breath.—2. Catechu 7 drachms, orris powder 40 grains, sugar 3 ounces, oil of rosemary, (or of cloves, peppermint, or

cinnamon,) 4 drops. Mix, and roll flat on an oiled marble slab, and cut into very small lozenges.—3. (*For Disinfecting the Breath.*)—Dry chloride of lime 2 drachms, sugar 8 ounces, and gum tragacanth 1 drachm; carmine 2 grains. Form into small lozenges.

PEAU D'ESPAGNE.—Peau d'Espagne, or Spanish skin, is nothing more than highly perfumed leather. Good and sound pieces of wash leather are to be steeped in a mixture of ottos, in which are dissolved some odoriferous gum resins, thus: Otto of neroli, otto of rose, santal, of each $\frac{1}{2}$ an ounce; otto of lavender, verbena, bergamotte, of each a $\frac{1}{4}$ of an ounce; otto of cloves and cinnamon, of each 2 drachms; with any others thought fit. In this mixture dissolve about 2 ounces of gum benzoin; now place the skin to steep in it for a day or so, then hang it over a line to dry. A paste is now to be made by rubbing in a mortar 1 drachm of civet with 1 drachm of grain musk, and enough solution of gum acacia or gum tragacantha to give it a spreading consistence; a little of any of the ottos that may be left from the steep stirred in with the civet, etc., greatly assists in making the whole of an equal body; the skin, being cut up into pieces of about 4 inches square, is then to be spread over, plaster-fashion, with the last-named compost; 2 pieces being put together, having the civet plaster inside of them, are then to be placed between sheets of paper, weighed or pressed, and left to dry thus for a week; finally, each double skin, now called peau d'Espagne, is to be enveloped in some pretty silk or satin, and finished off to the taste of the vender. Skin or leather thus prepared will evolve a pleasant odor for years.

PERFUME OF FLOWERS, To Extract.—Procure a quantity of the petals of any flower which has an agreeable flavor; card thin layers of cotton wool, which dip into the finest Florence oil; sprinkle a small quantity of fine salt on the flowers, and place layers of cotton and flowers alternately, until an earthen or wide-mouthed glass vessel is quite full. Tie the top close with a bladder, and lay the vessel in a south aspect, exposed to the sun, and in 15 days, when opened, a fragrant oil may be squeezed away from the whole mass, and but little inferior (if roses are used) to the dear and highly valued otto or odor of roses.

PERFUME for Sachets.—Orris root in powder 1 lb., musk 12 grains, essence of lavender 1 drachm, essence of ambergris 1 drachm, essence of bergamotte $\frac{1}{2}$ a drachm, essence of lemon $\frac{1}{2}$ a drachm.—2. Take any quantity of pure starch in powder, color it with a little finely-powdered rose-pink, and perfume it with otto of roses, oil of rosemary, lavender, and neroli, letting the rose predominate.—3. $\frac{3}{4}$ of a lb. lavender flowers, $\frac{3}{4}$ of an ounce of dried thyme, $\frac{3}{4}$ of an ounce of dried mint, $\frac{1}{4}$ of an ounce of cloves, $\frac{1}{4}$ of an ounce of caraway seeds, 1 ounce of fine salt. The lavender flowers must be rubbed from the stalk, the thyme and mint reduced to powder, and the cloves and caraway seeds bruised in a mortar. The whole should then be mixed with the salt, which must be well dried before it is used. When the ingredients have been thoroughly mixed, the compound may be put into silk or muslin bags for use.

PERFUME Powder for Boxes and Drawers.—1. Coriander powder, Florentine orris pow-

der, powdered rose leaves, powdered sweet-scented flag-root of each 2 ounces; lavender flowers powdered 4 ounces, musk 1 scruple, powder of sandal-wood 1 drachm. Mix.—2. Take of cloves, caraway seeds, nutmeg, mace, cinnamon, and Tonquin beans, of each 1 ounce; then add as much Florentine orris root as will equal the other ingredients put together. Grind the whole well together, and then put it in little bags among your clothes, etc.

PERFUME for Gloves.—Oil of lavender 20 drops, neroli 10 drops, essence of musk 5 drops, otto of roses 2 drops, alcohol 2 ounces. Mix.

PILLS, Ague.—Quinine 20 grains, Dover's powders, 10 grains, subcarbonate of iron 10 grains; mix with mucilage of gum Arabic and form into 20 pills. Dose—2 each hour, commencing 5 hours before the chill should set in. Then take 1 night and morning until all of them are taken.

PILLS, Anti-Bilious.—Aloes 28 parts, colocynth 12 parts, rhubarb 7 parts, myrrh and scammony of each $3\frac{1}{2}$ parts, ipecacuanha 3 parts, cardamom seed 2 parts, soft soap 9 parts, oil of juniper 7 parts, and treacle q. s. Divide into 4-grain pills, of which 2 or 3 are a dose.

PILL of Aloes, Compound.—Socotrine aloes in powder 1 ounce, extract of gentian $\frac{1}{2}$ ounce, oil of caraways 40 drops, and treacle a sufficient quantity. Beat together to a pill mass. Purgative, stomachic. Used in habitual costiveness. Dose—5 to 20 grains. Aloes are more easily powdered by adding 2 or 3 drops of olive oil to each ounce.

PILL of Aloes with Myrrh.—Powdered Socotrine aloes $\frac{1}{2}$ ounce, saffron, powdered myrrh and soft soap, of each 2 drachms, and of treacle a sufficient quantity. Beat together to a pill mass. Purgative emenagogue. Used in chlorosis and amenorrhea. Dose—5 to 15 grains.

PILL of Aloes with Soap.—Extract of Barbadoes aloes powdered, soft soap, and extract of licorice equal parts, and of treacle a sufficient quantity. Beat the aloes with the soap, add the other ingredients, and make a pill mass. Purgative. Dose—5 to 15 grains.

PILLS, Brandreth's.—Take 2 lbs. of aloes, 1 lb. of gamboge, 4 ounces of extract of colocynth, $\frac{1}{2}$ a lb. of castile soap, 2 fluid drachms of oil of peppermint, and 1 fluid drachm of cinnamon. Mix, and form into pills.

PILLS, Carbonate of Iron.—Sulphate of iron 4 ounces, carbonate of soda 5 ounces, clarified honey $2\frac{1}{2}$ ounces, of syrup and boiling water a sufficient quantity. Dissolve the sulphate of iron and carbonate of soda each in a pint of water, and to each solution add a fluid ounce of syrup; then mix the two solutions in a bottle just large enough to contain them, close it accurately with a stopper, and set it by that the carbonate of iron may subside. Pour off the supernatant fluid; and, having washed the precipitate with warm water, sweetened with syrup, in the proportion of a fluid ounce of the latter to a pint of the former, until the washings no longer have a saline taste, place it upon a flannel cloth, and express as much of the water as possible; then immediately mix it with the honey. Lastly, heat the mixture, by means of a water-bath, until it attains a pilular consistence.

PILLS, Cathartic.—Aloes and gamboge of each 1 ounce, mandrake and blood-root with gum myrrh, of each $\frac{1}{4}$ ounce; gum camphor

and Cayenne of each $1\frac{1}{2}$ drachms, and ginger 4 ounces; all to be finely pulverized and thoroughly mixed with thick mucilage (made by putting a little water upon equal quantities of gum Arabic and gum tragacanth) into pill mass; then formed into common-sized pills. Dose—2 to 4 pills, according to the robustness of the patient.

PILLS, Chalybeate, for Leucorrhœa.—Sulphate of iron 1 scruple, balsam of copaiba and licorice powder to mix. Divide into 40 pills. Dose—3 or 4, 3 times daily.

PILLS, Chamomile.—Aloes 12 grains, extract chamomile 36 grains, oil of chamomile 3 drops; make into 12 pills; take 2 every night, or twice a day.

PILLS, Cough.—Of extract of hyoscyamus, balm of Gilead buds, with pulverized ipecac or lobelia, and balsam of fir, each $\frac{1}{4}$ oz.; oil of anise a few drops to form into common-sized pills. Dose—1 or 2 pills, 3 or 4 times daily.

PILLS, Digestive.—Rhubarb 2 ounces, ipecacuanha $\frac{1}{2}$ ounce, Cayenne pepper $\frac{1}{4}$ ounce, soap $\frac{1}{2}$ ounce, ginger $\frac{1}{4}$ ounce, gamboge $\frac{1}{2}$ ounce. Mix, and divide into 4-grain pills.

PILLS, Dinner.—Aloes 20 grains, ginger $\frac{1}{2}$ drachm; add syrup sufficient to mix. Divide into 20 pills. 1 to be taken daily before dinner.

PILL, Emmenagogue.—Precipitated carbonate of iron and gum myrrh of each 2 drachms, aloes and tincture of Spanish flies of each 1 drachm, and oil of savin 1 drachm; all to be pulverized, and made into 100 pills by using thick gum solution. Dose—1 pill, from 1 to 3 times daily.

PILL, Female Laxative.—Aloes, macrotin, and cream of tartar, of each 2 drachms; podophyllin and ground ginger 1 drachm each; make into common-sized pills by using 15 or 20 drops of oil of peppermint, and a thick solution of gum Arabic mucilage. Dose—1 pill at bedtime, or 2 if found necessary, and sufficiently often to keep the bowels just in a solvent condition, but not less often than once a week.

PILLS, for Gravel.—Castile soap 8 parts, caustic soda 4 parts, oil of tartar to mix. Divide into 3-grain pills, 1 to be taken every 2 or 3 hours.

PILLS, Holloway's.—Aloes 4 parts, myrrh, jalap, and ginger, of each 2 parts, and mucilage to mix.

PILL of Iron.—Powdered myrrh 2 drachms, carbonate of soda, sulphate of iron and treacle, of each 1 drachm. In a warm vessel rub the myrrh with the soda, add the iron, and rub again; mix in the treacle, and form a mass. Tonic. Used in chlorosis. Dose—From 5 to 10 grains.

PILL, Liver.—Leptandrin 40 grains, podophyllin and Cayenne 30 grains each, sanguinarin, iridin, and ipecac, 15 grains each; see that all are pulverized and well mixed; then form into pill mass by using $\frac{1}{4}$ of a drachm of the soft extract of mandrake and a few drops of anise oil, and then roll out into 3-grain pills.

PILLS for Obstructed Menstruation.—Take sulphate of iron 30 grains, potassa (subcarb.) 30 grains, white sugar 30 grains, myrrh 1 drachm. Make them into 3-grain pills, 2 to be taken 3 times a day when there is no fever present.

PILLS to Promote Menstrual Secretion.—1. Take pills of aloes and myrrh 1 drachm, compound iron pills 70 grains. Mix and form into 25 pills. Dose—2 pills twice a day.—2. Take compound galbanum pill 1 drachm; Socotrine

aloes 1 drachm. Mix. Dose—2 pills, twice a day.

PILL, Nervous.—Alcoholic extract of the Ignatia Amara (St. Ignatius bean) 30 grains, powdered gum Arabic 10 grains. Make into 40 pills. Dose—1 pill to be taken an hour after breakfast, and 1 an hour before retiring at night.

PILL, Rhubarb.—Fine powdered rhubarb 4 drachms, powdered aloes 3 drachms, powdered myrrh 2 drachms, soft soap $\frac{1}{4}$ drachm, oil of caraway 15 drops, and of treacle a sufficient quantity. Mix the powders, add the other ingredients, and form a mass. Stomachic, purgative. Dose—5 to 20 grains.

PILLS for Sick Headache.—1 drachm of castile soap, 40 grains of rhubarb, 20 drops oil of juniper, and syrup of ginger enough to form 20 pills. Take 2 or 3 occasionally.

PILLS for Shortness of Breath.—Take $\frac{1}{4}$ of an ounce of powder of elecampane root, $\frac{1}{4}$ of an ounce of powder of licorice, as much flower of brimstone and powder of aniseed, and 2 ounces of sugar candy powdered. Make all into pills, with a sufficient quantity of tar; take 4 large pills when going to rest.

PILLS, To Sugar Coat.—Pills, to be sugar-coated, must be very dry, otherwise they will shrink away from the coating, and leave it a shell easily crushed off. When they are dry you will take starch, gum Arabic, and white sugar, equal parts, rubbing them very fine in a marble mortar, and if damp they must be dried before rubbing together; then put the powder into a suitable pan, or box, for shaking; now put a few pills into a small tin box having a cover, and pour on them just a little simple syrup, shaking well to moisten the surface only; then throw into the box of powder, and keep in motion until completely coated, dry and smooth.

If you are not very careful, you will get too much syrup upon the pills; if you do, put in more, and be quick about it to prevent moistening the pill too much, getting them into the powder as soon as possible.

PINK SAUCERS.—Safflower or carthamus, (washed,) 8 ounces, subcarbonate of soda 3 ounces, water 2 gallons. Macerate, strain, and add French chalk (scraped fine with Dutch rushes) 3 lbs., and precipitate the color on it with tartaric acid, a sufficient quantity.

PLASTER, Corn.—Yellow wax 1 lb., Venice turpentine 2 ounces, verdigris 1 ounce; melt together and spread on leather.

PLASTER, Court.—Soak bruised isinglass in a little warm water for 24 hours; then evaporate nearly all the water by gentle heat; dissolve the residue in a little proof spirits of wine, and strain the whole through a piece of open linen. The strained mass should be a stiff jelly when cool. Now extend a piece of silk on a wooden frame, and fix it tight with tacks or pack-thread. Melt the jelly, and apply to the silk thinly and evenly with a badger hair brush. A second coating must be applied when the first has dried. When both are dry, cover the whole surface with coatings of balsam of Peru, applied in this way. Plaster thus made is very pliable, and never breaks.

PLASTER, Irritating.—Tar 1 lb., Burgundy pitch $\frac{1}{4}$ ounce, white pine turpentine 1 ounce, rosin 2 ounces. Boil the tar, rosin and gum together a short time, and then remove from the fire, and stir in finely pulverized man-

drake root, blood root, poke root, and Indian turnip, of each 1 ounce.

PLASTER, Mustard.—Take a piece of waste linen, and, if crumpled, iron it smooth; or paper will do. Procure a small quantity of black mustard seed, and bruise it to a coarse powder, in a pestle and mortar or otherwise. Be particular not to have it too fine. Spread over the linen a thin solution of gum, and sprinkle the powder equally over it. Dry in a warm place. When wanted, plasters may be cut any size or shape; and when applied should be momentarily dipped in tepid water, and tied over the affected part with a bandage. These plasters are more simple, cleanly and effective than the ordinary mustard poultices.

PLASTER, Pitch.—Burgundy pitch 6 parts, yellow resin 8 parts, yellow wax 3 parts, lard 7 parts, turpentine 1 part, palm oil 1 part, linseed oil 1 part. Mix.

PLASTER, Poor Man's.—Take of beeswax 1 ounce, tar 3 ounces, resin 3 ounces; to be melted together, and spread on paper or muslin.

PLASTER, Rheumatic.— $\frac{1}{4}$ lb. of resin, and $\frac{1}{4}$ lb. of sulphur; melt them by a slow fire; then add 1 ounce of Cayenne pepper, and $\frac{1}{4}$ of an ounce of camphor gum; stir well till mixed, and temper with neats-foot oil.

PLASTER, Strengthening.—Litharge plaster 24 parts, white resin 6 parts, yellow wax and olive oil of each 3 parts, and red oxide of iron 8 parts. Let the oxide be rubbed with oil, and the other ingredients added melted, and mix the whole well together. This is an excellent plaster for relaxation of the muscles and weakness of the joints arising from sprains and bruises. The plaster, after being spread over leather, should be cut into strips 2 inches wide, and strapped firmly round the joint.

PLASTER, Styptic.—The property of chloride of iron to stop bleeding is well known, but the inconvenience of carrying it about often prevents its application when wanted. The French have a way of preparing a paper saturated with it that answers every purpose, and can easily be transported. This paper is immersed in a liquid prepared as follows: 1 lb. of finely pulverized gum benzoin, 1 lb. of alum, and 4 gallons of water are boiled in a well-tinned vessel, and filtered after cooling. The paper is well saturated with this mixture, and when it is dry a tolerably concentrated solution of chloride of iron is spread over it with a brush. It can be kept indefinitely when protected by wax cloth, and is admirably adapted for stopping the bleeding of small flesh wounds.

POMADE, Castor Oil.—Castor oil 4 ounces, prepared lard 2 ounces, white wax 2 drachms, bergamotte 2 drachms, oil of lavender 20 drops. Melt the fat together, and on cooling add the scents, and stir till cold.

POMADE, Cream.—Melt together 1 drachm each of white wax and spermaceti, and add oil of sweet almonds 2 ounces; pour it into a warm mortar, and gradually stir in 1 ounce of rose or other perfumed water, and 1 drachm of tincture of Tolu.

POMADE, Marrow.—Beef marrow 1 ounce, castor oil $\frac{1}{4}$ of an ounce, tincture of cantharides 1 drachm, essential oil of bitter almonds and of lemon of each 12 drops. This will be found very beneficial if the hair should show symptoms of falling off.

POMADE, Transparent.—1. Take of castor oil 1 lb., spermaceti $\frac{3}{4}$ lb., and sufficient of any desired perfume.—2. Fatty oil of almonds 2 lbs., Spermaceti $\frac{3}{4}$ of a lb., oil of lemon 3 ounces. The spermaceti is melted in a water bath, the oils are then added, and the heat kept up until a uniform mass is obtained, in which no floating particles of spermaceti can be distinguished. The pomade is then poured into glasses; if it is desired to obtain the pomade crystallized, the glasses must be heated beforehand, and cooled down very slowly.

POMADE DYE, for the Hair.—Nitrate of silver 1 part, nitric acid 2 parts, iron filings 2 parts. Mix, and let them stand together for 4 or 5 hours, then pour them on oatmeal 2 parts. Next add lard 3 parts, and mix well together.

POMATUM, Black Stick.—Prepared lard, melted, with one-third in winter, and one-half its weight in summer, of wax, and colored with powdered ivory-black, and strained through tannin, or any substance that will permit the fine particles of ivory-black to pass through. Stir it constantly, and when it begins to thicken pour it into paper moulds.

POMATUM, East India.—Take suet 7 lbs., lard 7 lbs., beeswax 1 lb. Melt, then add essence of lemon 4 ounces, gum benzoin 3 ounces, musk 2 scruples, oil of cloves 25 drops, oil of rhodium 25 drops. Mix well.

POMATUM, Marrow.—Purified lard 4 lbs., purified suet 2 lbs., otto of lemon 1 ounce, otto of bergamotte 1 ounce, otto of cloves 3 drachms. Melt the greases, then beat them up with a whisk or flat wooden spatula for a $\frac{1}{4}$ of an hour or more; as the grease cools, minute vessels of air are inclosed by the pomatum, which not only increase the bulk of the mixtures, but impart a peculiar mechanical aggregation, rendering the pomatum light and spongy; in this state it is obvious that it fills out more profitably than otherwise.

POMATUM, Philocome.—White wax 10 ounces, fresh rose oil 1 lb., fresh acacia oil $\frac{1}{4}$ lb., fresh jasmine oil $\frac{1}{4}$ lb., fresh fleur d'orange oil 1 lb., fresh tuberose oil 1 lb. Melt the wax in the oils by a water-bath at the lowest possible temperature. Stir the mixture as it cools; do not pour out the philocome until it is nearly cool enough to set; let the jars, bottles, or pots into which it is filled for sale be slightly warmed, or at least of the same temperature as the philocome, otherwise the bottles chill the material as it is poured in, and make it appear of an uneven texture.

POMATUM, Rose.—Of prepared lard 16 ounces, prepared suet 2 ounces; melt with a gentle heat, and add 2 ounces of otto of water, and 6 drops of otto of roses. Beat them well together, and pour into pots before it is cold. For making jessamine, violet, and orange pomade, put the same quantity of water, and 1 drachm of the required essence.

POSOLOGICAL TABLE; or, Rules for Administering Medicines, having reference to Age and Sex.—For an adult, (a person of 40 years) the dose is allowed to be about 1 drachm, 60 grains.

Those at 20 years,	2-3 of a drachm,	40 grains.
" 13 "	1-2 "	30 "
" 7 "	1-3 "	20 "
" 4 "	1-4 "	15 "
" 3 "	1-6 "	10 "

Those at 2 years, 1-8 of a drachm, 7 to 8 grains.
 " " " 1-12 " 5 "

For babes, under 1 year, the dose should go down by months, at the same rate as by years, for those over a year.

Again, for persons in advanced life, say from 60 years, the dose must begin to lessen about 5 grains, and, from that on, 5 grains for each additional 10 years.

Females, however, need a little less, generally, than males.

The above rules hold good in all medicines except castor oil, the proportion of which cannot be reduced so much, and opium and its various preparations, which must be reduced, generally, in a little greater proportion.

POULTICE, Charcoal.—Linseed meal $\frac{1}{4}$ of a lb., charcoal powder 2 ounces, hot water sufficient to give it the necessary consistence. This poultice is highly antiseptic—that is to say, it has great power in cleansing ulcers, and correcting a tendency to mortification.

POULTICE, Goulard's.—Take, a drachm and a half of extract of lead, rectified spirit of wine 2 ounces, water 12 ounces, and bread or cracker crumbs sufficient to make the whole into a proper consistence. This poultice is an excellent application to reduce swelling and inflammation, and to allay irritation.

POULTICE, Hemlock.—Pour 2 pints of water on 2 ounces of hemlock leaves, boil it down to a pint, and add as much linseed meal as may be necessary for the due consistency of the poultice. This is an excellent application to cancerous and other malignant sores. It greatly diminishes the existing pain. The fresh herb forms the best poultice.

POULTICE, Yeast.—Flour 1 lb., yeast of beer $\frac{1}{4}$ of a pint. Mix, and expose the mixture to a gentle heat till it begins to swell, when it is ready for use. This poultice is well adapted as an application to painful, foul, or gangrenous ulcers. It is a gentle stimulant to such ulcerations, corrects any tendency to mortification, cleanses the sore, and removes the fetid odor.

POWDER, Ague.—Quinine 10 grains, capsicum 4 grains; mix and divide into 3 powders. Directions—Take 1 about 4 hours before the chill, 1 about 2 hours before the chill, and the third 1 hour before the chill should commence.

POWDER, Composition.—Bayberry bark 2 lbs., hemlock bark 1 lb., ginger root 1 lb., Cayenne pepper 2 ounces, cloves 2 ounces; all very finely pulverized and well mixed. Dose—One-half of a teaspoon of it, and a spoon of sugar; put them into a tea-cup, and pour it half full of boiling water; let it stand a few minutes, then fill the cup with hot water, and drink freely.

POWDERS, Condition.—Black antimony 4 ounces, flour of sulphur 2 ounces, bean flour or barley meal $\frac{1}{4}$ of a lb. A tablespoonful to be given with the feed.—2. Sulphur 2 lbs., fennugreek 4 lbs., cream of tartar 1 lb., licorice 1 lb., nitre 1 lb., black antimony $\frac{1}{4}$ of a lb., gentian $\frac{1}{4}$ of a lb., aniseed $\frac{1}{4}$ of a lb., common salt 1 lb. Dose—1 ounce daily for 2 or 3 weeks.

POWDERS, Dover's.—Ipecacuanha in powder 1 drachm, opium in powder 1 drachm, salt-petre in powder 1 ounce. The above ingredients should be reduced to a very fine powder. Dose—For an adult from 10 to 20 grains.

POWDER, Filtering.—Fuller's earth, purified and powdered, mixed with animal charcoal.

Used to filter oils, etc., and to render various liquids whiter.

POWDERS, Lemonade.—White sugar 36 drachms, carbonate of soda 4 drachms, essence of lemon 15 drops; divide into 12 blue papers. In 12 white papers divide 6 drachms of tartaric acid. Mix the first well in water, and add the last. Each powder contains 3 drachms of sugar, 20 grains of soda, 2 drops of essence of lemon, and 30 grains of acid. Pleasant refrigerant drink.

POWDER, Pearl, for the Complexion.—Take pearl or bismuth white and French chalk, equal parts. Reduce them to a fine powder, and sift through lawn.

POWDER, Rose Face.—Wheat starch 7 lbs., rose pink 1 drachm, otto of rose 2 drachms, otto of santal 2 drachms.

POWDERS, Seidlitz.—Rochelle salts 2 drs., bicarbonate of soda 2 scruples; put these into a blue paper, and put tartaric acid 35 grains into a white paper. To use, put each into different tumblers, fill $\frac{1}{8}$ with water, and put a little loaf sugar in with the acid, then pour together and drink.

POWDER, Tooth.—1. Take powdered charcoal and white sugar of each 1 ounce; Peruvian bark $\frac{1}{2}$ an ounce, cream of tartar 1 $\frac{1}{2}$ drachms, carnella 24 grains. Rub them well together and pulverize in a mortar. The above powder will cleanse the teeth, strengthen the gums, sweeten the breath, and prevent the toothache.—2. Take pumice stone and cuttle-fish bone of each $\frac{1}{2}$ an ounce, vitriolated tartar and mastic of each 1 drachm, oil of rhodium 4 drops. Mix all into a fine powder.—3. (Antiseptic.) Prepared chalk 2 ounces, dry chloride of lime 10 grains, oil of cloves 5 drops. It may be colored, if preferred, by a little levigated bole.—4. (Anti-scorbutic.) Extract of rhatany $\frac{1}{2}$ ounce, prepared charcoal 2 ounces, cinnamon $\frac{1}{4}$ ounce, cloves $\frac{1}{4}$ ounce.—5. (Rhatany.) Rhatany root 2 ounces, cuttle-fish bone 4 ounces, prepared chalk 8 ounces, borax 1 drachm.—5. (Violet.) Orris root 2 ounces, cuttle-fish bone 4 ounces, precipitated chalk 12 ounces, bicarbonate of soda $\frac{1}{2}$ ounce, essence of violets 1 drachm, and rose pink enough to give it a pale violet color.—6. (Charcoal.) Prepared charcoal 1 ounce, sugar 1 ounce, oil of cloves 3 drops. Mix.—7. (Paste.) Pumice stone 1 $\frac{1}{2}$ ounce, alum $\frac{1}{4}$ drachm, bitartrate of potash 1 ounce, cochineal 2 scruples, bicarbonate of potash 1 drachm, orris 1 ounce, syrup 3 ounces, essence of lemon 1 drachm, oil of cloves and essence of bergamotte of each 1 drachm, otto of roses 8 drops. Mix.

QUININE, Substitute for.—Signor Pavia has extracted from the leaves and roots of the box (*Buxus sempervirens*) an alkaloid, which he calls buxina, that has been found most efficacious in a large number of cases treated by 7 different Italian physicians. It is in the severe intermittent fevers that prevail in the marshy parts of Italy that the new drug has been put to the test. Out of 608 cases submitted to the new alkaloid, 535 were completely cured—nearly 80 per cent.—enough to permit the claim for it as a specific to be entertained.

In a single dose of 15 grains, sulphate of buxine generally prevents the next paroxysm from appearing. In a few cases it only diminishes the intensity of the paroxysm. It is only in rare cases that a second dose has had to be given.

The drug seems effectual in every type of disease attributed to marsh miasms.

RED RASPBERRY.—This is an astringent. A tea made of the leaves is an excellent remedy for the bowel complaints of children. A little of the bark of slippery elm improves its efficacy. It should also be given in the form of an injection. The tea is used as a wash and gargle; and if drank freely it has a good effect in a cancerous state of the mouth, throat and stomach.

RED PRECIPITATE.—Quicksilver, nitric acid, equal parts. Dissolve, decant, and evaporate to dryness, in a sand heat, until it assumes the proper color.

REMEDY for Drunkenness.—Tartar emetic 8 grains, and rose-water 4 ounces. Mix. Put a tablespoonful into the whole quantity of liquor drank each day by the patient, and let him take it as usual. Be careful not to exceed a tablespoonful or $\frac{1}{2}$ an ounce.

REMEDY for Gout and Rheumatism.—Gum guaiacum 1 ounce, rhubarb in powder 2 drachms, flour of sulphur 2 ounces, cream of tartar 1 ounce, ginger powder 1 ounce. Make them into an electuary with treacle. Dose—2 teaspoonfuls night and morning.

REVALENTA ARABICA.—This article for dyspepsia and constipation is what is sometimes called Ervalenta, and is said to be compounded mainly from a species of lentil. A popular kind is made by taking lentil meal 1 part, and Turkey millet flour 2 parts. It is sometimes prepared by mixing Indian meal and bean flour, equal parts of each, with a little salt and sugar, and mingling all together by passing it through a sieve. This preparation (as an article of food for dyspeptics) instead of being nutritious, is only an irritant to the bowels, because of the difficulty experienced in digesting the lentil meal.

PINK, ROSE.—Take a strong decoction of Brazil wood, to which add a little pearlash, and then pour it over finely-sifted whiting, and reduce it to a thick paste; then dry slowly.

ROOT, Alkanet.—This root gives a fine red tinge to oils, fats, wax, turpentine, spirits, essences, etc., and is used to color hair oil, pomatums, ointments, varnishes, etc. The spirituous solution stains marble of a deep red; wax tinged with alkanet, and applied to warm marble, leaves a flesh color.

ROOT, Gold Thread.—The root, chewed, is good for canker, or other sore mouth; and, prepared by decoction, as a gargle in sore throat. The tea is useful in cases of general debility and loss of appetite.

ROOT, Golden Seal.—This is an admirable remedy in case of dyspepsia. A half teaspoonful of the powder, with a half teacupful of boiling water, taken immediately after eating, when the food distresses one, often gives relief.

ROOT, Rhubarb.—Rhubarb is generally cultivated in our gardens for the sake of the stalks, which are made into excellent pies; the root, however, is of great efficacy in some diseases. 6 to 10 grains are astringent and strengthening to the stomach. In larger doses—from a scruple to half a drachm—it is first purgative and then astringent. It is, therefore, an excellent medicine for diarrhea and dysentery, because it evacuates any acrid matter that may be offending the bowels, before it acts as an astringent.

ROOT, Yellow Dock.—This is one of the

most valuable remedies known in diseases of the skin. The best preparation is to bruise the fresh roots in a mortar, and add cream or fresh butter enough to make an ointment; and it may also be taken internally at the same time, either in decoction or combined with such articles as are useful for the internal treatment of bad humors and scrofulous conditions of the system. It is a certain and safe remedy for the troublesome disease known as the itch.

ROUGE.—Wash safflowers until the water comes away colorless; dry the flowers, powder them, and digest in a weak solution of carbonate of soda. Place some cotton wool at the bottom of the vessel, then add white vinegar till it ceases to produce a precipitate; wash the wool in cold water, dissolve the color in a fresh solution of soda, add some finely powdered French chalk, mix well, precipitate with vinegar as before, dry the powder carefully, and triturate it with a little olive oil, to render it smooth and adhesive.

—2. Take 1 lb. of best Brazil wood, fine, and of golden color, infuse 4 days in 4 quarts of best white wine vinegar; then boil them together for 1 hour; strain through a linen cloth, and place the liquid in 1 pint of white vinegar; mix the 2 liquids and stir them well together. The scum which now arises should be carefully taken off, and gradually dried and powdered.—3. Mix vermilion with enough of gum tragacanth dissolved in water to form a thin paste; add a few drops of almond oil, place the mixture in rouge pots, and dry by a very gentle heat.—4. Take 1 pint of alcohol, and 1 ounce of alkanet; macerate 10 days, and pour off the liquid, which should be bottled. This is the simplest and one of the best articles of the kind.—5. Boil 1 ounce of Brazil dust in 3 pints of distilled water, and then strain; add 6 drachms of isinglass, 2 drachms of cochineal, 1 ounce of alum, and 8 drachms of borax; boil again, and strain through a fine cloth.

SACHET A LA FRANGIPANNE.—Orris root powder 3 lbs., vitivert powder $\frac{1}{4}$ of a lb., sandal wood powder $\frac{1}{4}$ of a lb., otto of neroli 1 drachm, otto of rose 1 drachm, otto of santal 1 drachm, musk-pods, ground, 1 ounce.

SACHET HELIOTROPE.—Powdered orris 2 lbs., rose leaves, ground, 1 lb., tonquin beans ground $\frac{1}{2}$ a lb., vanilla beans $\frac{1}{4}$ of a lb., grain musk $\frac{1}{4}$ of an ounce, otto of almonds 5 drops. Well mixed by sifting in a coarse sieve, it is ready for use.

SACHET ROSE.—Rose heels or leaves 1 lb., sandal wood ground $\frac{1}{2}$ lb., otto of roses $\frac{1}{4}$ of an ounce.

SALVE, Black.—Lard 24 parts, white oxide of zinc 3 parts, Peruvian balsam 3 parts, nitrate of silver (finely pulverized) 1 part.

SALVE, Brown.—Take of rosin 5 lbs., Burgundy pitch, beeswax and mutton tallow, each $\frac{1}{4}$ of a lb.; oil of hemlock, balsam of fir, oil of origanum, oil of red cedar, and Venice turpentine, each 1 ounce; oil of wormwood $\frac{1}{2}$ an ounce. Melt the first articles together, and then add the oils, stirring well; pour into cold water, and work like wax until it is cool enough to roll.

SALVE, Balm of Gilead.—Mutton tallow $\frac{1}{4}$ lb., balm of Gilead buds 2 ounces, white pine gum 1 ounce, red precipitate 1 ounce, hard soap 1 ounce, white sugar 1 tablespoonful. Stew the buds in the tallow until the strength is obtained,

and press out or strain; scrape the soap, and add it with the other articles to the tallow, using sufficient unsalted butter or sweet oil to bring it to a proper consistence to spread easily upon cloth. When nearly cool, stir in the red precipitate, mixing thoroughly.

SALVE, Felon.—A salve made by burning 1 tablespoonful of copperas, then pulverizing it and mixing with the yolk of an egg, is said to relieve the pain, and cure the felon in 24 hours; then heal with cream 2 parts, and soft soap 1 part. Apply the healing salve daily after soaking the part in warm water.

SALVE, Green Mountain.—Rosin 5 lbs., Burgundy pitch, beeswax, and mutton tallow, of each $\frac{1}{4}$ lb.; oil of hemlock, balsam of fir, oil of origanum, oil of red cedar, and Venice turpentine, of each 1 ounce; oil of wormwood $\frac{1}{2}$ an ounce, verdigris very finely pulverized 1 ounce; melt the first articles together, and add the oils, having rubbed the verdigris up with a little of the oils, and put it in with the other articles, stirring well; then pour into cold water, and work as wax until cool enough to roll.

SALVE, Conklin's.—Rosin 4 lbs., beeswax, Burgundy pitch, white pine turpentine and mutton tallow, each $\frac{1}{4}$ lb.; camphor gum and balsam of fir, of each $\frac{1}{4}$ of an ounce; sweet oil 1 ounce, and alcohol 1 pint. Melt, mix, roll out, and use as other salves.

SALVE, Kitridge's.—Bitter-sweet and sweet elder roots of each 1 lb., hop vines and leaves, and garden plantain, top and root, of each $\frac{1}{4}$ lb.; tobacco, about 2 ounces. Boil all in rain water to get out the strength; then put the herbs in a thick cloth, press out the juice, and boil down carefully to one half a pint; then add unsalted butter 1 lb., beeswax and rosin of each 1 ounce, and simmer over a slow fire until the water is all out.

SALVE, LIP.—Take 1 ounce of the oil of almonds, $\frac{1}{4}$ ounce of spermaceti, and $\frac{1}{4}$ drachm of prepared suet, with any simple vegetable coloring to fancy; simmer these until thoroughly mingled; as soon as taken off the fire, stir into the mixture 3 or 4 drops of tincture of capsicum, and when nearly cold 5 or 6 drops of oil of rhodium.—2. Butter of cocoa 1 ounce, oil of almonds 1 ounce; melt together with a gentle heat, and add 6 drops of essence of lemon.—3. Put into an earthen pipkin 1 lb. of fresh butter, 1 lb. of fine yellow wax, 1 ounce of alkanet, and 3 bunches of black grapes; boil together, and strain without pressure, through linen.—4. Of almond oil, $\frac{1}{4}$ lb., spermaceti and wax each 2 ounces, alkanet root 2 ounces, otto of roses 1 drachm. Place the wax, sperm and oil on the alkanet root, in a vessel heated by a steam or water bath; after the materials are melted, they must digest on the alkanet, to extract its color, for at least 4 or 5 hours; finally, strain through fine muslin, and then add the perfume just before it cools.

SALVE, Russia.—Take equal parts of yellow wax and sweet oil, and melt slowly, at the same time carefully stirring; when cooling, stir in a small quantity of glycerine. Good for all kinds of wounds, etc.

SARSAPARILLA, Decoction of.—Take 2 ounces of sarsaparilla root, sliced, and bruise it, then add 1 ounce of guaiacum wood; boil over a slow fire in 3 quarts of water till reduced to 1 quart; shortly before removing it from the

saucepan, add $\frac{1}{2}$ an ounce of sassafras wood and 3 drams of licorice; afterward strain it.

SASSAFRAS.—It is an aromatic or pleasant tonic. Sassafras, prickly ash, dogwood, and American gentian, make as powerful and as pleasant a bitter as the foreign gentian, colombo, Peruvian bark, cloves, and cinnamon, that we buy at the drug store.

SHOW COLORS, for Druggists' Windows.—A beautiful blue is obtained by dissolving a few crystals of sulphate of copper in water, and supersaturating the solution with ammonia. A green color is obtained by dissolving nitrate or chloride of nickel in water. Nitrate of cobalt will give a rose color. Other tints may be selected from the different aniline dyes, those soluble in alcohol being preferable. They should be renewed every 3 or 6 months, as they will gradually lose their brightness. (See page 68.)

SALTS, Inexhaustible for Smelling Bottles.—Liquid ammonia 1 pint, otto of rosemary 1 drachm, otto of English lavender 1 drachm, otto of bergamotte $\frac{1}{2}$ a drachm, otto of cloves $\frac{1}{2}$ a drachm. Mix the whole together with agitation in a very strong and well-stoppered bottle.

This mixture is used by filling the smelling bottles with any porous absorbent material, such as asbestos, or, what is better, sponge cuttings, that have been well beaten, washed and dried. (See page 71.)

SNUFF, Catarrh.—Scotch snuff 1 ounce, chloride of lime dried and pulverized 1 rounding teaspoonful; mix and bottle, corking tightly.

SNUFF, Cephalic.—Dried asarabacca leaves 3 parts, marjoram 1 part, lavender flowers 1 part; rub together to a powder.

SPONGE, To Bleach.—Soak the sponge in very dilute muriatic acid to remove calcareous matter; then in cold water, changing it frequently, and squeezing the sponge out each time. Then soak it in water, holding a little sulphuric or sulphurous acid, or chlorine in solution, and changing the acid frequently till the sponge is sufficiently bleached. Last, repeatedly wash and soak in clean water, and scent with rose or orange-flower water.

SPONGE TENT, To Prepare.—The old way was by saturating the sponge with warm melted wax, and compressing it until the wax solidified, and then getting it into a suitable shape. The method of Dr. Sympson, of Edinburgh, is to saturate sponge, previously cleaned, with thick gum mucilage, and then having put an awl through its centre, a cord is forcibly wound round it so as to expel most of the mucilage, and reduce the size of the sponge to a small diameter; it is then dried, the cord is removed, and the outside of the tent rubbed down with sand-paper to the proper shape.

Dr. H. Nott, of New York, prepares antiseptic sponge tent by saturating the prepared sponge with an antiseptic paste composed of alum, acetate of lead, wheat flour and gum water, heated to the boiling point, and wrapped in goldbeater's skin. It is then punctured with a small knife-blade.

SPECIFIC for Dysentery.—Take 1 lb. of gum Arabic, 1 ounce of gum tragacanth, dissolved in 2 quarts of soft water, and strained. Then take 1 lb. of cloves, $\frac{1}{2}$ a lb. of cinnamon, and the same quantity of allspice, and boil in 2 quarts of soft water, and strain. Add it to the gums, and boil all together over a moderate

fire, and stir into it 2 lbs. of loaf sugar. Strain the whole again when you take it off, and when it is cool add to it $\frac{1}{2}$ a pint of sweet tincture of rhubarb, and $1\frac{1}{2}$ pints of best brandy. Cork it tight in bottles, as the gums will sour if exposed; if corked properly it will keep for years.

SYRUP, Cough.—Put 1 quart of horehound to 1 quart of water, and boil it down to a pint; add 2 or 3 sticks of licorice and a tablespoonful of essence of lemon. Take a tablespoonful of the syrup 3 times a day, or as often as the cough may be troublesome.

SYRUP for Consumptives.—Take tamarack bark, without roasting, (the moss may be brushed off,) 1 peck, spikenard root $\frac{1}{2}$ a lb., dandelion root $\frac{1}{4}$ of a lb., hops 2 ounces. Boil these sufficiently to get the strength in 2 or 3 gallons of water; strain and boil down to 1 gallon; when blood warm add 3 lbs. of honey and 3 pints of the best brandy; bottle, and keep in a very cool place. Dose—A wine-glassful, or a little less, as the stomach will bear, 3 or 4 times daily, before meals and at bed-time.

SYRUP, Hive.—Squill and seneka bruised of each 4 ounces, tartrate of antimony and potassa 48 grains, water 4 pints, sugar $3\frac{1}{2}$ lbs. Pour the water on the squill and seneka, and boil to half the original quantity. Strain and add the sugar; then evaporate to 3 pints, and, while the syrup is still hot, dissolve in it the tartrate of antimony and potassa.

SYRUP, Soothing.—Take 1 lb. of honey, add 2 tablespoonfuls of paregoric, and the same of oil of aniseed, add enough water to make a thick syrup, and bottle. Dose—For children teething, a teaspoonful occasionally.

SYRUPUS, Stillingia Compound.—Queen's root 2 lbs., root of Turkey-corn 2 lbs., blue flag root 1 lb., elder flowers 1 lb., pipsissewa leaves 1 lb., coriander seed $\frac{1}{2}$ lb., prickly ash berries $\frac{1}{2}$ lb. Grind and mix the articles together; place the whole 8 lbs. in a convenient vessel, cover them with 76 per cent. alcohol, and macerate for 3 days. Then convey the whole to a displacement apparatus, and gradually add alcohol until 4 pints of the alcoholic tincture have been obtained, which retain and set aside. Then continue the percolation with water, and of this second solution reserve so much as contains a sensible amount of spirit, and distil or evaporate the alcohol from it. Continue the displacement by water until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its alcohol, it will make 24 pints. To these 2 solutions combined add 24 lbs. of refined sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds 28 pints, evaporate to that point with constant stirring. Then remove from the fire, and when nearly cold add the 4 pints of reserved alcoholic tincture, and make 4 gallons of syrup, each pint of which will be equal to 4 ounces of the ingredients in medical virtue.

SYRUP of Tar.—Tincture of tar 2 ounces, carbonate of magnesia 1 ounce, water a sufficient quantity, sugar 1 lb. Rub the tincture with the carbonate, add gradually $\frac{3}{4}$ of a pint of water; then filter, and pour on water through the filter to make the liquid measure $\frac{3}{4}$ of a pint; lastly, add the sugar, and dissolve with the aid of gentle heat.

SYRUPS for Mineral Waters.—1. *Simple.* White sugar 10 lbs., water 1 gallon, best isinglass $\frac{1}{4}$ of an ounce. Dissolve the isinglass in hot water, and add it to the hot syrup. The syrup is to be made with gentle heat, and then strained.—2. *Lemon*—a. Grate off the yellow rind of lemons, and beat it up with a sufficient quantity of granulated sugar. Express the lemon-juice, add to each pint of juice 1 pint of water, and 3 lbs. of granulated sugar, including that rubbed up with the rind; warm until the sugar is dissolved, and strain.—3. *Lemon*—b. Simple syrup 1 gallon, oil of lemon 25 drops, citric acid 10 drachms. Rub the oil of lemon with the acid, add a small portion of syrup, and mix.—4. *Strawberry*—a. Strawberry juice 1 pint, simple syrup 3 pints, solution of citric acid 2 drachms.—5. *Strawberry*—b. Fresh strawberries 5 quarts, white sugar 12 lbs., water 1 pint. Sprinkle some of the sugar over the fruit in layers, and allow the whole to stand for several hours; express the juice and strain, washing out the pulp with water; add the remainder of the sugar and water, bring the fluid to the point of boiling, and then strain. This will keep for a long time.—6. *Raspberry.* Raspberry juice 1 pint, simple syrup 3 pints, solution of citric acid 2 drachms. Raspberry syrup may also be made in a way similar to No. 5 for strawberry.—7. *Vanilla.* Fluid extract of vanilla 1 ounce, Citric acid $\frac{1}{4}$ of an ounce, simple syrup 1 gallon. Rub the acid with some of the syrup, add the extract of vanilla, and mix.—8. *Vanilla Cream.* Fluid extract of vanilla 1 ounce, simple syrup 3 pints, cream or condensed milk 1 pint; may be colored with carmine.—9. *Cream.* Fresh cream 1 pint, fresh milk 1 pint, powdered sugar 1 lb. Mix by shaking, and keep in a cool place. The addition of a few grains of bicarbonate of soda will for some time retard souring.—10. *Ginger.* Tincture of ginger 2 fluid ounces, simple syrup 4 pints.—11. *Orange.* Oil of orange 30 drops, tartaric acid 4 drachms, simple syrup 1 gallon. Rub the oil with the acid, and mix.—12. *Pineapple.* Oil of pineapple 1 drachm, Tartaric acid 1 drachm, simple syrup 6 pints.—13. *Orgeat.* Cream syrup 1 pint, Vanilla syrup 1 pint, oil of bitter almonds 4 drops.—14. *Nectar.* Vanilla syrup 5 pints, pineapple syrup 1 pint, strawberry, raspberry or lemon 2 pints.—15. *Sherbet.* Vanilla syrup 3 pints, pineapple syrup 1 pint, lemon syrup 1 pint.—16. *Grape.* Brandy $\frac{3}{4}$ of a pint, spirits of lemon $\frac{1}{4}$ of an ounce, tincture of red sanders 2 ounces, simple syrup 1 gallon.—17. *Banana.* Oil of banana 2 drachms, tartaric acid 1 drachm, simple syrup 6 pints.—18. *Coffee.* Coffee roasted $\frac{1}{2}$ of a lb., boiling water 1 gallon. Enough is filtered to make about one-half gallon of the infusion, to which add granulated sugar 7 lbs.—19. *Wild Cherry.* Wild cherry bark in coarse powder 5 ounces. Moisten the bark with water, and let it stand for 24 hours in a close vessel. Then pack it firmly in a percolator, and pour water upon it until 1 pint of fluid is obtained. To this add 28 ounces of sugar.—20. *Wintergreen.* Oil of wintergreen 25 drops, simple syrup 5 pints, and a sufficient quantity of burnt sugar to color.—21. *Sarsaparilla*—a. Oil wintergreen 10 drops, oil of anise 10 drops, oil of sassafras 10 drops, fluid extract of sarsaparilla 2 ounces, simple syrup 5 pints, powdered extract of licorice 1 ounce.—22. *Sarsaparilla*—b. Simple syrup 4

pints, compound syrup of sarsaparilla 4 fluid ounces, caramel $1\frac{1}{2}$ ounces, oil of wintergreen 6 drops, oil of sassafras 6 drops.—23. *Maple*. Maple sugar 4 lbs., water 2 pints.—24. *Chocolate*. Best chocolate 8 ounces, water 2 pints, white sugar 4 pounds. Mix the chocolate in water, and stir thoroughly over a slow fire. Strain, and add the sugar.—25. *Coffee Cream*. Coffee syrup 2 pints, cream 1 pint.—26. *Am-brosia*. Raspberry syrup 2 pints, vanilla syrup 2 pints, hock wine 4 ounces.—27. *Hock and Claret*. Hock or claret wine 1 pint, simple syrup 2 pints.—28. *Solferino*. Brandy 1 pint, simple syrup 2 pints.—29. *Fruit Acid* (used in some of the syrups.) Citric acid 4 ounces, water 8 ounces. Most of the syrups not made from fruits may have a little gum Arabic added in order to produce a rich froth.

SWEET FERN.—Sweet fern grows in the woods and in stony places, flowers from June to October, and is well known. It is a powerful medicine to expel the tapeworm, in the dose of a pint a day of the decoction, or 1 or 2 teaspoonfuls of the powder, to be followed on the fifth day by a dose of some kind of physic. It is also good in chronic rheumatism, and a wash of it is considered beneficial in St. Anthony's fire, and other cutaneous affections.

TANNIN, Purification of.—In order to free commercial tannin from the peculiar odor which it derives from a greenish-colored resin, Deinz recommends to dissolve 6 parts of it in 12 parts of hot water in a porcelain mortar, to pour the fluid into a bottle, and after the addition of $\frac{1}{2}$ to 1 part of ether, to shake it vigorously. The mixture appears cloudy and very greenish, but becomes clear after a few hours' standing, while the resinous coloring matter separates in flakes of coagulated albumen. The fluid is then filtered, and the filtrate evaporated to dryness. Tannin treated in this way is colorless, and forms a perfectly clear solution.

TINCTURE of Cantharides.—Cantharides bruised $\frac{1}{2}$ an ounce, proof spirit 2 pints. Macerate 6 or 7 days, express and strain. Stimulant, diuretic, and must be used with caution. Dose—10 drops, gradually increased to 1 drachm, given in any mucilaginous fluid. Externally used, combined with compound camphor liniment, as a rubefacient in rheumatism, frost-bites or unbroken chilblains. An ingredient in remedies for baldness.

TINCTURE, Cholera.—Select the thinnest cinnamon bark, cloves, guaiac, all pulverized, of each 1 ounce; very best brandy 1 quart. Mix, and shake occasionally for a week or two. Dose—Teaspoonful to tablespoonful for an adult, according to the condition and robustness of the system. It may be repeated at intervals of 1 to 4 hours, if necessary, or much more often, according to the condition of the bowels.—2. Sulphuric ether 2 ounces, and put into it castor and gentian, of each $\frac{1}{4}$ of an ounce; opium and agaric each 1 drachm, gum camphor $\frac{1}{4}$ of an ounce; let them stand 2 days, then add 1 quart of alcohol, and let it stand 14 days, when it is ready for use. Dose—1 teaspoonful every 15 or 20 minutes, according to the urgency of the case.

TINCTURE, Diarrhea.—Compound tincture of myrrh 6 ounces, tincture of rhubarb and spirits of lavender of each 5 ounces, tincture of opium 3 ounces, oils of anise and cinnamon,

with gum camphor and tartaric acid, of each $\frac{1}{4}$ of an ounce. Mix. Dose—1 teaspoonful in half a tea-cupful of warm water, sweetened with loaf sugar; repeat after each passage.

TINCTURE, Gout.—Veratrum viride (swamp hellebore) 1 ounce, opium $\frac{1}{4}$ of an ounce, wine 1 pint; let them stand for several days. Dose—15 to 30 drops, according to the robustness of the patient, at intervals of 2 to 4 hours.

TINCTURE (Sweet) of Rhubarb.—Take of rhubarb bruised 2 ounces, licorice root bruised 2 ounces, aniseed bruised 1 ounce, sugar 1 ounce, diluted alcohol 2 pints. Macerate for 14 days, express and filter.

TINCTURE of Musk.—Powdered musk 1 ounce, civet 30 grains, otto of roses 25 drops, oil of cloves 10 drops, alcohol 4 pints. Digest.

TINCTURE of Opium.—Opium 3 ounces, proof spirit 2 pints. Macerate for 7 days, express and strain. Dose: From 2 drops to 1 or 2 drachms. 1 grain of opium is contained in 19 drops.

TINCTURE of Pearls (for the Complexion.)—Blanched almonds 1 lb., acetate of lead 4 ounces, water 7 pints. Reduce them to a milk and then strain; add spirit 3 pints, essence of neroli and essence of lavender each 1 drachm. This is used for removing freckles.

TINCTURES for the Teeth.—1. Camphor 4 ounces, myrrh 2 ounces, rectified spirits 36 fluid ounces, distilled water 8 ounces.—2. Spirit of nutmegs 1 drachm, tincture of rhatany 2 drachms, compound tincture of cardamons 3 drachms, compound spirit of lavender and spirit of cinnamon of each 1 drachm, otto of roses 3 drops. Mix.—(Myrrh.) Choice Turkey myrrh 3 ounces, eau de Cologne 1 quart. Digest for 7 days, and then filter.—4. (Myrrh and Borax.) Take spirits of wine 1 quart, borax 1 ounce, honey 1 ounce, gum myrrh 1 ounce, red sanders wood 1 ounce. Rub the honey and borax well together in a mortar, then gradually add the proof spirit, the myrrh and sanders wood, and macerate for 14 days.

VACCINE VIRUS, To Keep.—Immerse it in the fresh state in glycerine, of which the best quality only should be used. It should be kept in a cool place, and never at a temperature higher than 84° Fahrenheit.

VERMIFUGE (Swain's.)—Of wormseed 2 ounces, valerian, rhubarb, pink-root, white agaric, of each 1 ounce; boil in sufficient water to yield 3 quarts of decoction, and add to it 30 drops of oil of tansy, and 45 drops of oil of cloves, dissolved in a quart of rectified spirits. Dose: 1 tablespoonful at night.—2. (Fahnestock's.) Castor oil 1 ounce, oil of wormseed 1 ounce, oil of anise 1 ounce, tincture of myrrh 1 oil of turpentine 10 minims. Mix.

VINEGAR, Toilet.—1. (Aromatic.) Acetic acid 1 pint, camphor 2 ounces, oil of lavender 1 drachm, oil of cinnamon 20 drops, oil of cloves and oil of rosemary each 30 drops; mix thoroughly. To be used as a reviving perfume in fainting, etc. As it is corrosive it should not be allowed to come in contact with the skin or the clothes.—2. (Henry's.) Dried leaves of rosemary, rue, wormwood, sage, mint, and lavender flowers, each 1 ounce; bruised nutmeg, cloves, angelica root, and camphor, each 1 ounce; alcohol, 4 ounces, concentrated acetic acid 16 ounces. Macerate the materials for a day in the spirit, then add the acid, and digest for a week longer

at a temperature of about 14 or 15° C. Finally, press out the new aromatized acid, and filter it.

WATER, Carlsbad, (Artificial).—Hydrochlorate of lime 8 grains, tincture of sesquichloride of iron 1 drop, sulphate of soda 50 grains, carbonate of soda 60 grains, hydrochloride of soda 8 grains, carbonated water 1 pint.

WATER, Cologne.—1. The recipes for Cologne water are innumerable; the quality of the preparation depends altogether on the purity of the oils, and greatly on the quality of the alcohol. (*First Quality.*)—Pure alcohol 6 gallons, oil of neroli 4 ounces, oil of rosemary 2 ounces, oil of orange 5 ounces, oil of citron 5 ounces, oil of bergamotte 2 ounces. Mix with agitation, and then allow it to stand for a few days perfectly quiet before bottling.—2. (*Second Quality.*) Pure alcohol 6 gallons, oil of neroli 2 ounces, oil of rosemary 2 ounces, oil of orange peel 4 ounces, oil of lemon 4 ounces, oil of bergamotte 4 ounces. To be treated in the same manner as the first.

WATER, Congress.—Take of supercarbonate of soda 2 drachms, Epsom salts 1 drachm, table salt 1 drachm, well water (soft) 1 quart; mix the powders in a black bottle, and pour on the water; then add of tartaric acid 1 drachm to each bottle, and cork tight immediately. Fit for use in 12 hours.

WATER, Congress (for Fountains).—Common salt $7\frac{3}{4}$ ounces, hydrate of soda 20 grains, bicarbonate of soda 20 grains, calcined magnesia 1 ounce. Add to 10 gallons of water, and then charge with gas.

WATER, Eye.—1. Soft water 1 pint, gum Arabic 1 ounce, white vitriol 1 ounce, fine salt $\frac{3}{4}$ of a teaspoonful; put all into a bottle and shake until dissolved. Put into the eye just as you retire to bed.—2. Take 1 pint of rose-water, and add 1 teaspoonful each of spirits of camphor and laudanum. Mix and bottle. To be shaken and applied to the eyes as often as necessary.—3. Sulphate of copper 15 grains, French bole 15 grains, camphor 4 grains, boiling water 4 ounces. Infuse, strain, and dilute with 2 quarts of cold water.

WATER, Florida.—Take oil of bergamotte 3 ounces, oil of cinnamon 4 drachms, tincture of benzoin 2 ounces, alcohol 30 per cent. Baume 1 gallon. Mix and filter.

WATER, Goulard.—Extract lead 1 drachm, and of distilled vinegar 2 ounces, proof spirit of wine $\frac{3}{4}$ of an ounce, water 1 pint. Mix these ingredients together.

WATER, Honey.—Rectified spirits 8 pints, oil of cloves, oil of lavender, oil of bergamotte, each $\frac{3}{4}$ of an ounce; musk 8 grains, yellow sanders shavings 4 ounces; digest for 8 days, and add 2 pints each of orange flower and rose-water.

WATER, Hungary.—Take oil of rosemary 2 ounces, of balm and lemon peel of each 1 ounce, mint 30 drops, essence of orange flowers and essence of roses of each 1 pint, alcohol 1 gallon.

WATER, Kissingen, (for Fountains).—Bicarbonate of soda 1 drachm, carbonate of lime 2 drachms and 2 scruples, precipitated carbonate of lime 2 scruples, common salt 8 ounces, muriate of ammonia 4 grains, sulphate of soda 2 drachms and 2 scruples, sulphate of magnesia 2 ounces, phosphate of soda 13 grains, phosphate of lime 2 drachms and 2 scruples. Mix. Add water $\frac{3}{4}$ of a gallon. Let it stand for 6 hours,

filter, add carbonate of magnesia 3 drachms and 1 scruple, and charge with 10 gallons of water.

WATER, Lavender.—1. Oil of lavender 4 ounces, proof spirit 3 quarts, rose water 1 pint. Mix and filter.—2. (*Odoriferous.*)—Oil of lavender 3 drachms, oil of bergamotte 20 drops, oil of neroli 6 drops, otto of rose 6 drops, essence of cedrat 8 drops, essence of musk 20 drops, rectified spirit 28 fluid ounces, distilled water 4 ounces.

WATER, Lime.—Lime $\frac{3}{4}$ of a lb., distilled water 12 pints. Slake the lime with a little water, add the remaining water, and shake; set the covered vessel aside for 3 hours, keep the liquor and lime in stopped glass vessels, and when it is required decant the clear portion for use. Antacid, lithontriptic. Allays obstinate vomiting, is used as an astringent in dysentery, and, with sarsaparilla, as an alternative in cutaneous diseases or impaired digestion. Dose—1 to 3 ounces, combined with an equal quantity of milk.

WATER, Rose.—Otto of roses 12 drops, white sugar 1 ounce, magnesia 2 drachms, pure soft water 1 quart, alcohol 2 ounces. Rub the otto of roses with the sugar and magnesia, and gradually add the water and alcohol, previously mixed, and filter the whole through paper.

WATER, Vichy (for Fountains).—Sulphate of potash 2 drachms, sulphate of soda 4 scruples, phosphate of soda 25 grains, common salt 6 drachms, bicarbonate of soda 5 ounces, carbonate of ammonia 10 grains. Mix. Add water 1 gallon. Let it stand 1 day, filter, and then change with 10 gallons of water.

WASHBALL, Perfumed.—Take of the best white soap, shaved into slices, 3 ounces; of Florentine orris 1 ounce, of calamus aromaticus the same, of elder-flowers, cloves and dried rose-leaves, each 1 ounce; coriander seeds, lavender, and bay leaves, each 1 drachm; with 3 drachms of storax. Reduce the whole to a fine powder, which knead into a paste with the scrap, adding a few grains of soap or ambergris. When you make this paste into washballs, soften it with a little oil of almonds to render the composition more lenient. This soap has excellent cleansing and cosmetic properties.

WAFERS, Bryan's Pulmonic.—Take white sugar 7 lbs., tincture of syrup of ipecac 4 ounces, antimonial wine 2 ounces, morphine 10 grains, dissolved in a tablespoonful of water, with 10 or 15 drops of sulphuric acid; tincture of blood root 1 ounce, syrup of tolu 2 ounces; add these to the sugar, and mix the whole mass as confectioners do for lozenges, and cut into lozenges the ordinary size.

WINTERGREEN.—It is useful in spasmodic asthma, in urinary, and in female weaknesses. It relieves cramp from wind in the stomach; and the juice, boiled with sweet oil, wax and turpentine, makes a salve which is used to heal wounds.

WITCH HAZEL.—A tea of the leaves and bark is useful to wash putrid sores; and it will also remove that diseased or dead substance known as "proud flesh." For this purpose a poultice should be made of a strong infusion and applied to the sore, or it may be washed gently with the tea.

WRIGHI'S CURE for Inflammatory Rheumatism.—Sulphur and saltpetre of each 1 ounce, gum guaiac 1 ounce, colchicum root, or seed.

and nutmegs, of each $\frac{1}{4}$ of an ounce all to be pulverized and mixed with simple syrup, or molasses, 2 ounces. Dose—1 teaspoonful every 2 hours until it moves the bowels rather freely; then 3 or 4 times daily until cured.

WORMSEED (*Oak of Jerusalem*).—This is a vermifuge or anthelmintic medicine, that is good to destroy worms. A tablespoonful of the

juice of the plant expressed or squeezed out is a dose. The seed may be boiled in milk; give a wineglassful. Or 1 or 2 teaspoonfuls of the seed itself may be mixed with molasses or honey, and given to a child 2 or 3 years old, on an empty stomach, twice a day and continued several days. This is very highly prized for bowel complaints.

DOMESTIC ANIMALS.

ANIMALS, Effects of Kindness on.—The law that is to usher in the advent of the Golden Age is the law of kindness—the law of love between man and man. If this law, or even a portion of it, be applied by man to the government, or rather the directing of the so-called "brute" creation, it will be wonderful how easily they can be brought under subjection and control. The efficacy of the soothing word, the gentle touch, has only to be honestly tried to be fully appreciated. It may be set down as a fixed fact that whenever a horse or a cow or an ox is timid and shy—will not allow a person to approach or handle, unless it is so situated that it cannot escape—a wrong system of treatment has been pursued. The animals of the farmer are naturally disposed to be docile and affectionate. They recognize the voice and hand of a friend almost as soon as a human being would, and manifest their affection in a variety of ways, which none but the kind master or keeper will observe. Have you not seen teamsters who could manage their teams by a soft word far better than others could do by blows and harsh words? I have. Have you not seen a milkmaid approach a cow with a bucket without the slightest evidence of a disposition on the part of the animal to evade her? And have you not seen the same cow make every effort to escape from the next milkmaid who approaches her? I have, and the reason was that the first had always treated her kindly and gently, while the latter had pursued the opposite method. Animals almost invariably partake of the character of their masters. The kind, gentle and considerate master will generally have kind, gentle animals; while the rude, impetuous and cruel master will rarely fail to have animals whose dispositions will make with his own. Is not gentleness the true method? I think so. God has given those poor brutes for our use; they minister to our wants, are patient and uncomplaining, and certainly deserve such treatment at our hands as will show that we properly appreciate the kindness of the Almighty in giving them to us for the purpose of adding to our comfort.

CATTLE.

CATTLE, AGE OF, How to Tell.—The age of the ox or cow is told chiefly by the teeth, and less perfectly by the horns. The temporary teeth are in part through at birth, and all the incisors are through in 20 days; the first, second, and third pairs of molars are through in 30

days; the teeth have grown large enough to touch each other by the sixth month; they gradually wear and fall in 18 months; the fourth permanent molars are through at the fourth month; the fifth at the fifteenth month; the sixth at 2 years. The temporary teeth begin to fall at 21 months, and are entirely replaced by the thirty-ninth to the forty-fifth month. The development is quite complete at from 5 to 6 years. At that time the border of the incisors has been worn away a little below the level of the grinders. At 6 years the first grinders are beginning to wear, and are on a level with the incisors. At 8 years the wear of the first grinders is very apparent. At 10 or 11 years, used surfaces of the teeth bear a square mark, surrounded by a white line; and this is perceived on all the teeth by the twelfth year; between the twelfth and the fourteenth year, this mark takes a round form. The rings on the horns are less useful as guides. At 10 or 12 months the first ring appears; at 20 months to 2 years the second; at 30 to 32 months the third; at 40 to 46 months the fourth; at 54 to 60 months the fifth ring, and so on. But, at the fifth year, the 3 first rings are indistinguishable, and at the eighth year all the rings; beside, the dealers file the horns.

CATTLE, BREACHY.—To prevent bore a hole through each end of the board, where they will exactly fit the horns without stretching or pressing. Let the holes be small enough not to go too far down on the horns. Leave about an inch of the horn sticking through the board; drill a small hole through it, large enough to admit a horse-nail as a key. The board, reaching from this cross-piece to the nose, may be screwed fast to it; there will be play enough on the horns to give the necessary swing. If nails are used, which is seldom necessary, they should be very smoothly blunted.

CATTLE, Catarrh in.—Malignant catarrh, or coryza, has been confounded with the cattle plague or rinderpest, in some points of which there is a resemblance. **Symptoms.**—In first stage a shivering fit may be observed; dullness, head held low, ears pendulous, the visible membranes of which are of a bluish-red color and dry; eyes closed and swollen, tears flow, and light cannot be endured; muzzle dry and hot, saliva discharged abundantly; painful cough, pulse frequent and full, heart's action feeble, bowels costive, feces black and hard, but after a short time diarrhea ensues; urine scanty, offensive, and of a high color; is thirsty, but eats

eats nothing. The second stage occurs within 18 or 24 hours from the appearance of the first signs of disturbance, and is denoted by a very marked change in the character of the discharges. The membranes of the eyes and nose now furnish a purulent secretion, having an admixture of blood and ichor, which irritates and makes sore the skin over which it flows. Within the sinuses of the head large accumulations of pus occur, and when the bones over them are tapped by the fingers (percussed) a dull sound is emitted. If the mouth is opened, red patches will be observed, which in some places will have fallen off, exposing a foul ulcer beneath, and the membranes are now of a deeper purple hue, and the breath fetid. The animal is lame, and experiences great pain when urine or dung is discharged. Pregnant animals are almost sure to cast their young (abort.) In the third stage great prostration is evident. Sloughing of membranes extensive, and probably the horns and hoofs have come off. The pulse has become imperceptible, and convulsions ensue, with general coldness. The thermometer indicates a rapid and unusual fall, 90 to 95° F. being the amount of heat that can be registered at the rectum. Sometimes ulceration of the cornea is effected before death, and the contents of the eyeball discharged, giving rise to a great amount of additional pain. *Duration.*—From 4 to 9 or 11 days. *Treatment.*—Remove the animal from the pasture, and place it in a comfortable, cool place, with good bedding. Cooling or evaporating lotions, water, etc., should be constantly applied to the head. Injections of warm water should be thrown up. The following laxative drink may be administered:

Take of Epsom salts 12 oz., ground ginger 2 oz., treacle $\frac{1}{2}$ lb., and warm ale $1\frac{1}{2}$ pts. Mix and give to a 2-year old beast; $\frac{1}{4}$ for 1 year old; $\frac{1}{2}$ at 6 months, and $\frac{1}{4}$ for lesser animals, as calves, sheep, and large pigs. 2 or 4 drs. of nitre in water may be given 3 or 4 times a day. Solutions of carbolic acid, or sulphurous acid gas and chlorine in water, should be used for the purpose of dressing the wounds and cleansing the points of discharge, etc. It may also be necessary to open the sinuses and sponge them, using the same solutions.

CATTLE, CHOKED, To Relieve.—In choking, the accumulation of gas (chiefly sulphuretted hydrogen) is the cause of the animal's death. This gas can be decomposed by the forcing of chloride of lime down the animal's throat. A strong solution of salt and water will also effect the same object. Another mode of relief is to force the animal to jump over the bars of a gate or fence, as high as she will jump, and when she touches ground on the opposite side the obstruction will be ejected. Another plan is to take a loaded gun, slip up by the side of the animal, place the muzzle directly between the horns, about 3 inches forward of them, and discharge the piece. A sudden spring of the animal backward results, and the obstruction is removed. And yet another is to use 4 or 5 feet of $\frac{3}{4}$ rubber hose, and push the obstruction down.

CATTLE, BLACK'LEG IN.—This can be cured by thoroughly washing the diseased leg in strong soap suds; rub till dry; then scrape the knots with a dull knife; then take 1 ounce of vitriol and dissolve in strong vinegar, after

which the leg must be very thoroughly bathed and dried.

CATTLE, Feeding and Care of.—The two great points in the feeding of cattle are regularity and a particular care to the weaker individuals. On this last account there ought to be plenty of rack or trough room, that too many may not feed together; in which very common case the weaker are not only trampled down by the stronger, but they are worried, cowed and spiritless; than which there cannot be a more unfavorable state for thrift; beside, they are ever compelled to shift with the worst of the fodder. To prevent this the weaker animals should be kept and fed apart. The barn or stable should be kept warm in winter. During the winter months, whenever the sun shines, turn them into the yard, and they will soon find the sunny side, and begin to stretch themselves and show increased comfort. A good plan is to feed them meal or roots early in the morning, without any hay, and turn them out a little after sunrise, and then feed hay, either in the yard or at the adjoining stack, putting them back in the stalls as early as 4 P. M., stormy or extreme cold weather excepted, when they should be kept comfortably housed the most of the time. *In Fattening*, the farmer should remember that it does not pay to feed grain to a poor creature—one that does not take on flesh rapidly. This kind of stock should at once be disposed of for what it will bring. The next important point is to feed plentifully, without stint, and to do this regularly and not too often, as the stock will eat and lie down and ruminate.

CATTLE, Film on Eyes of.—To remove it apply clean lard, warm or cold, which ever way it can be got into the eye best. Its application will cause no pain, and should be applied until the film is removed. Another method is to apply powdered sugar.

CATTLE, Foot and Mouth Disease in.—On the first indication of this disease, the affected cattle should at once be separated from the healthy, so as to secure against the spreading of the disorder. Next make a mixture composed of 5 lbs. of alum to 12 gals. of soft water, 4 qts. of salt, and a small quantity of tar, and with a sponge or rag wash the inside of the mouths thoroughly of those not affected. Next bathe the lower portion of the legs with suds formed from carbolic disinfecting soap, to which is added 1 qt. of salt to about 1 gal. suds. Repeat the bathing and washing once a day for 7 days. The affected animals should be treated in the same manner, with the exception of washing the inside of the mouth twice a day—once with the mixture given above, and once with wormwood steeped in vinegar. To the division of the hoof apply suds at first, and afterwards apply a mixture of pitch and tar. The buildings should be thoroughly disinfected by carbolic acid, chloride of lime, and other disinfectants, and if the cattle themselves be treated with the fumes of burning sulphur, it will help to prevent further infection, for which purpose drop small pieces of brimstone upon live coals, contained in suitable metallic vessels, (so as to avoid all risk of communicating fire,) and allow the fumes to mingle with the air of the lean-to, or building containing the cattle, and to penetrate the coats of the beasts, and to be inhaled to such extent as can be borne by the attendant without serious

discomfort. Let this be regularly repeated, daily or twice daily while the danger continues, using from 1 to 2 ounces each time, according to the extent of the danger. Finally, the animals should be kept in a dry, comfortable place, suitably ventilated, and receive good nursing, including the utmost cleanliness. No bleeding must be allowed, nor should active purgatives be given them. If unable to take their usual food, their strength should be sustained by giving mashings of coarse-ground wheat, with bran or other similar diet.

CATTLE, HOOFF ROT IN.—For a cure, take 1 teacupful of sharp cider vinegar, $1\frac{1}{2}$ tablespoonfuls of copperas, $1\frac{1}{2}$ tablespoonfuls of salt. Dissolve gradually on the hot stove, but do not let it boil. When cool, apply it on the affected limb and hoof, and also swab out the mouth of the animal with the mixture. 2 or 3 applications generally effects a cure. This preparation can be used in the foot and mouth disease in connection with the above treatment.

CATTLE, Hoven or Bloat in.—A certain remedy for this is to take a pail of water, fresh from the stream, and pour it from a jug forward of the hip bones, rubbing it on with the hands. It will be found that the bloat will at once commence to go down, and by applying 2 or 3 more pailfuls complete restoration will result.

CATTLE, LICE ON, To Destroy.—1. Camphor dissolved in spirits is an effectual remedy.—2. 1 part lard and 2 parts coal oil, melted together and applied, will kill lice without fail.—3. A strong brine, thickened with soft soap, will also kill.—4. 2 or 3 applications of kerosene oil, applied by carding the animal, and dipping the teeth of the card in the oil, is convenient, harmless and effectual.—5. Feeding onions to the animal will make the lice travel in from 10 to 15 hours.

CATTLE, MANGE IN.—This is caused by improper treatment of the animal through the winter, rendering it debilitated and unable to support the change when the grass comes on. Nature, overloaded, will relieve herself by this eruption on the skin, which, once introduced, will quickly spread through an entire dairy. The treatment required is proper attention to cleanliness, food, drink, and plenty of sunlight.

CATTLE PLAGUE.—Chloride of copper is now extensively used in Germany as a preventive against the cattle plague. The mode of administering the specific is as follows: A solution is first made by dissolving $\frac{1}{4}$ of an oz. of the green crystallized salts in spirits of wine. In this solution a pad of cotton is soaked for a little while, and is then laid on a plate and set on fire in the centre of the stable, the animals' heads being turned toward the flame, so as to make them breathe the fumes. The operation is performed morning and evening, and a spirit lamp filled with the solution left burning in the stable every night. The liquid is also administered internally, with the addition of $\frac{1}{2}$ an oz. of chloroform for the above quantity, a teaspoonful being put into the animal's drink 3 times a day.

CATTLE'S HORNS, Sawing Off.—A celebrated professor of a London Veterinary College has said, concerning this practice: I consider this to be a very gross act of cruelty, and for this reason—that the horns of oxen are very

unlike those of the deer species. They have a large proportion of bone growing out from the bone of the head, and that is surrounded by a heavy sensitive structure, so that, to cut the animal's horns, they had to go below where it was simply horny, and the animal had to suffer much pain. The nearer the operation was performed to the skull, the greater the suffering. That bone was hollow—that is to say, it had not one single horned cavity—but it had several cells which extended into the head, though not to the brain, but close to it. These cavities were exposed, by the removal of the horns, to the air; and as they are lined with a delicate, sensitive membrane—there being, beside, a delicate, sensitive covering outside—great suffering must be caused. The cavities were never intended by Nature to be exposed to the air, which brought on an inflammatory condition. These cavities were very apt to be inflamed, and the inflammation was very likely to be extended to the membranes of the brain, causing madness, lock-jaw, or other dangerous results. This operation is one of the most painful and unwarrantable that could possibly be performed on cattle.

CATTLE, SNAKE-BITTEN, Remedy for.—Cattle or horses are usually bitten in the feet. When this is the case, all that is necessary to do is to drive them into a mud-hole and keep them there for a few hours; if upon the nose, bind the mud upon the place in such a manner as not to interfere with their breathing.

CATTLE, Sore Mouth in.—Take a weak solution of carbolic acid—say 1 to 5 drops to the ounce of water—washing the mouth every few hours, allowing a little to be swallowed, and following this with mild tonics and food that will not irritate the mouth.

CATTLE, Warts on.—1. To remove warts from cattle, mix equal parts of blue vitriol, lard and honey, and anoint them once in 4 or 5 days; they will be removed without making a sore.—2. Wash with a strong ley made of pearl ash and water 3 times a day.—3. Or make 2 or 3 applications of lunar caustic.

CATTLE, WENS ON.—Wens cannot be cured, except by a surgeon's removing them altogether with a scalpel, followed by the application of a healing ointment.

COWS, ABORTION IN.—The predisposing cause for this disease is constitutional in the animal, while the exciting cause may be ill-treatment at the time of pregnancy, damp surroundings, food in which ergot of rye may be found, impure water, etc. The predisposing cause can be avoided by giving the generative organs of the animal a rest. The doing of this, by a freedom of from six months to a year from pregnancy, will almost insure freedom from abortion—especially so if care is taken in the avoiding of all supposable exciting causes. Many farmers may not be willing to endure the loss involved in this suggestion; but it will be a gain in the end, because no animal aborts without, in a greater or less measure experiencing such a shock to her system as will tell on her future health and value.

COWS, Care of.—1. Cows should run dry 6 weeks before calving; if milked closely toward calving, the calves will be poorer.

2. A cow newly come in should not drink cold water in cold weather, but moderately warm water. Calves, intended for raising, should be

taken from the cow within a few days, and they will be less liable to suck when they are old. Feed them first on new milk for a short time, and then on skim milk, taking care that all the changes are gradual, by adding only a portion at first.

3. Hearty eaters are desirable for cows, and may usually be selected while calves. A dainty calf will be a dainty cow.

4. Heifers dried up too early after calving, will always run dry about the same time in after years—therefore, be careful to milk closely the first year, until about 6 weeks previous to the time for calving.

5. Spring cows should come in while they are yet fed on hay, and before they are turned to grass, which will be more likely to prevent caked bag and milk fever.

6. The best times for feeding the cow are early in the morning, at noon, and a little before sunset.

7. Abundance of the purest water must always be supplied, and it ought in all cases, when practicable, be what is understood as soft water. In winter the water given should be warmed to the temperature of the air on a summer day.

8. The food given should be as nearly in its natural state as possible. Cooking food, slops, brewers' grains, etc., are all objectionable, where either firm, healthy flesh or pure rich milk is desired.

COWS, DAIRY, To Select.—Cows of extraordinary milking qualities are as often found among the native as among grade and thoroughbred animals; and, as a rule, the progeny of these extra-milkers become the best cows, and every heifer-calf from such should be raised, except it fails to carry the mark indicating a good milker. This mark is the upward growth of the hair on the inside of the thighs of the calf from immediately behind the udder, as high as the hair goes. If it be found running up in a very smooth and unbroken column—all other things being equal—with good care and continued fine growth, there will scarcely be a failure. But whatever extraordinary qualities the cow may possess, unless this mark is found on the calf, it is not worth raising for a dairy cow. There are several other signs and conditions indicative of valuable milking qualities, some of which attend the first described. Smooth and fair-sized teats; a large and long milk vein; slim neck; and sometimes 6 teats; a yellow skin, apparent about the eyes and nose, and other bare spots, are indications of rich milk, and one of the indications of a good cow.

COWS, FARROW, What to Do With.—Feed them liberally and they will give rich milk, though, perhaps, not much of it. Let them have 3 or 4 quarts of meal a day through the winter and spring, and do not stop giving it to them when grass comes. As soon as it dries them up they will be fit for the butcher.

COWS, BLOODY MILK IN.—To cure, give a tablespoonful of milk in a little bran or meal, and renewing the dose the second or third day. Another remedy is to give a tablespoonful of sulphur in a little dry bran once a day—in very bad cases, twice a day.

COWS, GARGET IN.—This disorder is very frequent in cows after ceasing to be milked; it affects the glands of the udder with hard swellings, and often arises from the animal not

being clean milked. It may be removed by giving a pint of beans a day for 4 or 5 days. The beans should be soaked and mixed with meal to make the cow eat them; but the better way is to grind the beans and feed a pint a day with other meal. This will be found a sure remedy. Another plan is to give the cow 1 teaspoonful of the tincture of arnica, in bran or shorts, three times a day, and bathe the bag thoroughly with it as often. The arnica for bathing should be reduced $\frac{1}{2}$ in warm water, and bathe with the hand.

COWS, HARD-MILKING.—The causes for cows holding up their milk are various—irregularity in time of milking, imperfect milking, and lack of water in pastures; over-driving in bringing animals home; the taking of the calf away—and especially will this be the case where the calf, while being reared, is kept in a situation where the mother can keep up an acquaintance with it; and finally the presence of a vicious or sulky disposition in the cow, the slightest dissatisfaction making them hold up their milk. These last are unprofitable and only fit for the shambles. The remedy in usual cases is, besides the avoidance of the apparent cause, gentleness, kind words, and a system of petting the animals, so as to gain their confidence and affection, coupled with plenty of good water and feed.

COWS, KICKING.—Cows seldom kick without some good reason for it. Teats sometimes are chapped or the udder tender; harsh handling hurts them, and they kick. Sometimes long and sharp finger nails cut their teats, and sometimes the milker pulls the long hairs on the udder, while milking. Shear off the long hairs, cut long finger nails close, bathe chapped teats with warm water, and grease them well with lard, and always treat a cow gently. She never will kick unless something hurts her, or she fears a repetition of former hurts. When handled gently cows like to be milked. When treated otherwise, they will kick and hold up their milk. Occasionally a cow is found that, like some men, has a bad, ungovernable temper, that flies at merely imaginary offences. For this class take a small strap long enough for the purpose, and bend the foreleg so as to bring the foot up to the body. Then put the strap round the arm and small part of the leg, near the hoof, crossing between so as not to slip off over the knee, and buckle. In this condition it is an impossibility for a cow to kick; they may come to the knee a few times, but are soon quiet. Never, as some do, confine the hind legs, either singly or together, for in doing this there is danger of spoiling the animal. Milkers should study the temper of the cows they milk, and find out whether a cow kicks on account of pain or willfulness. If it is from bad temper, the strap applied to the foot is a very good way to subdue her, but you should avoid whipping and beating in all cases.

COWS, RHEUMATISM IN.—The treatment of rheumatism should consist in placing the animal in a moderately warm place, and giving diet of a generous character. In cases where the pain is severe, the tincture of aconite in 20 drop doses may be given with advantage. Friction to the joints will be found beneficial; and, where much swelling exists, the liniment of ammonia may be rubbed in daily. Cooling applications do not seem to suit this complaint. The enlargements in the joints sometimes become

chronic, and should then be treated with applications of the tincture of iodine.

COWS, MILKING, The Right Method of.—Some persons in milking seize the root of the teat between the thumb and forefinger, and then drag upon it until it slips out of their grasp. In this way teat and udder are subjected to severe traction for an indefinite number of times, and in rude hands are often severely injured. Others, again, by carelessness and want of thoroughness, will cause the usual quantity of milk to shrink one-third in 2 weeks. In many localities more cows are ruined from faults of bad milking than from all other causes that act specially on the udder. The proper mode of milking is to take the teat in the entire hand, and, after pressing it upward, that it may be well filled from the capacious milk reservoir above, to compress it first at the base between the thumb and forefinger, then successively by each of the 3 succeeding fingers, until completely emptied. The teat is at the same time gently drawn upon, but any severe traction is altogether unnecessary, and highly injurious.

COWS, To Increase their Milk.—Give your cows, 3 times a day, water slightly warm, slightly salted, in which bran has been stirred at the rate of 1 quart to 2 gallons of water. You will find, if you have not tried this daily practice, that the cow will give 25 per cent, more milk, and she will become so much attached to the diet that she will refuse to drink clear water unless very thirsty, but this mess she will drink almost any time and ask for more. The amount of this drink necessary is an ordinary water-pail full each time, morning, noon and night. Avoid giving cows "slops," as they are no more fit for the animal than the human.

COWS, Milk Fever in.—Immediately there are indications of milk fever, the animal should be restricted to an exclusive hay diet. This treatment should be followed, even in summer time, unless the animal is kept in very close pasture and shows no tendency to fatten. This moderate feeding of hay only should be continued until the fourth or fifth day after calving, at which time the full flow of milk is established, and the danger of puerperal fever has become slight.

COWS, OLD, When to Kill.—It is a question among farmers as to what age cows can be properly used for dairy purposes, and when it is best to dispose of them on account of age. It will depend somewhat on the breed of the animals and the usage they have received. As a general rule, when a cow has entered her teens, she has approximated closely the limit of her usefulness in the dairy line. A good farmer has remarked that a cow was never worn out so long as there was any room on her horns for a new wrinkle.

COWS, SELF-SUCKING.—A good, simple and cheap arrangement to prevent cows from sucking themselves, or each other, may be made by making a halter as follows: Take 2 or 3 straps 2 inches wide, and long enough to reach around the cow's nose. Stitch the edges together, and the ends also, with sharp nails inserted every $1\frac{1}{2}$ inches, so that the points will stand outward. The heads of the nails should be very large, and should be between the two straps when sewed together. Now fasten two side straps, with a buckle on one end of one, so

that when the part with the nails is around the nose the side straps may be buckled together over the head, back of the horns; the part that goes around the nose should be large enough to allow the animal to eat freely. This arrangement will be effectual, but many think it cruel, especially in fly time. A much more desirable and effectual method is to put on a good strong halter, put the animal in a good stall, keep her clean, and feed as much cooked meal as she will eat, until her milking season nearly runs out, and then send her to the butcher. Doing this, it will be found that the milk will pay for the extra feed and care, and the beef will be in prime condition.

COWS, Swelled Bags in.—An excellent remedy for swelled bags of cows, caused by cold, etc., is $\frac{1}{2}$ ounce of camphor gum to 2 ounces of sweet oil; pulverize the gum, and dissolve over a slow fire.

COWS' TEATS, Warts on.—Warts on the teats of cows usually extend no deeper than the skin. They should not be removed while the cow gives milk. The most effectual way is to take hold of the end of a wart with pliers, and cut it off with sharp shears. The cut should not be deeper than the skin. This remedy will not hurt a cow as much as clipping the skin does sheep when they are being sheared; or a piece of small wire may be twisted around a large wart sufficiently tight to obstruct the circulation of the blood, and left on till the wart drops off, leaving the surface smooth.

CHALK FOR CALVES.—When an animal is found licking his fellow, it is proof that uneasiness is present in the stomach, and the licking of his neighbor is a habit contracted by instinct, with a view of removing the unpleasantness. Unfortunately instinct is not at all times sufficient to avoid dangerous practices, and, if we take for granted that the stomach is at all times fully charged with acrid matter, we shall without hesitation find a remedy. It is only necessary to place within their reach shallow troughs, in which is kept a supply of common chalk. If an animal has a superabundance of acrid secretion, it will most certainly swallow some of the chalk, which will as certainly neutralize the excess of acid. If an animal has not acid in excess, and partakes of the chalk, it will do no harm. It is often too late to administer remedies to young stock, and the placing of chalk within their reach cannot be made too early.

COOKING FOOD FOR STOCK.—The great profit of steaming food to feed to stock is, that it converts much of the woody fibre of hay, straw, etc., into soluble, fat-forming nutriment. It is commonly supposed that, as cattle chew the cud, all the nutriment is extracted from the hay, fodder, grain, etc., eaten. So far from this, nothing short of boiling or its equivalent, steaming, can convert woody fibre into soluble nutriment. The same rule is applicable to grain, potatoes, and roots generally; heat is essential to dissolving the starch of grains and roots to render it available, as well as to dissolve the elements out of woody fibre. The heat of the animal system, together with the gastric juices, perform, but imperfectly, the same that steaming or cooking does. Experience and careful experiments have demonstrated that a very much larger proportion of food is assimilated into the system if cooked than if fed uncooked. In very

cold weather a greater amount of heat-forming matter is required to keep up animal heat than in mild or warm weather. At such times extra hay or straw may be fed, to sustain this heat, without cutting and steaming, yet this latter process would add largely to its nutriment, without diminishing its heat-forming power. In this connection the following directions will be found serviceable:

To Cook Hay.—Cut it, wet it well, put it in upright tanks or casks, with false bottom and tight cover, press it down firmly, pass the steam in under the false bottom, and cook until done.

To Cook Corn.—Soak as many barrels, half-full, as you wish to cook from 15 to 24 hours; turn on steam and cook until done, when the barrels should be full. *To Make Mush.*—Fill as many barrels half-full of water as you wish to make barrels of mush; bring the water nearly to a boil by passing the steam to the bottom; stir in each barrel from $1\frac{1}{2}$ to $1\frac{3}{4}$ bushels of meal until well mixed; then cook until done, when the barrels should be full. *To Cook Vegetables.*—Fill the barrels full, and, if no other cover is at hand, chop the top fine with a shovel; then cover them over with bran meal or provender, and cook until done; have holes in the bottoms of the barrels to carry off condensed steam.

COTTON SEED FOR STOCK.—Very many farmers believe that cotton seed for stock is superior to corn, and ample experiment seems to confirm this view. To cook cotton seed, take a large kettle, which holds from 5 to 6 bushels, set it upon a brick furnace, fill it with cotton seed fresh from the gin, and then fill up the kettle with water, and boil something less than $\frac{1}{2}$ an hour; then empty the seed into troughs, and let the cattle and hogs to them. The milk and butter have none of that cotton-seed taste which the green or uncooked seed gives. Both cattle and hogs will keep in good order winter and summer on seed thus prepared; and when you are ready to fatten pork, you have only to add an equal quantity of cotton-seed and corn, and boil as above. Experience has proved that it will fatten much sooner and be equally good as when fattened on corn alone. Your cows will give an abundance of milk all winter when fed in this manner, with but 1 bushel of corn to 4 of cotton-seed.

CONDIMENTAL FOOD, THORLEY'S.

—The advertisements of the patentees of this English preparation would lead to the belief that their "cattle food" contains more real nourishment than the ordinary kinds of food which have hitherto been given; but chemical analysis shows the incorrectness of these statements. There is no secret in the composition, for the test is at hand in a simple analysis. The following is an ordinary formula to make 1 ton of the meal: Take of Indian meal 900 weight, locust bean finely ground 600 weight, best linseed cake 300 weight, powdered tumeric and sulphur of each 40 lbs., saltpetre 20 lbs., licorice 27 lbs., ginger 3 lbs., aniseed 4 lbs., coriander and gentian of each 10 lbs., cream of tartar 2 lbs., carbonate of soda and levigated antimony each 6 lbs., common salt 30 lbs., Peruvian bark 4 lbs., fenugreek 22 lbs. The reader will observe that the chief ingredients are corn meal, locust bean, and linseed cake; these form its bulk, and constitute nine-tenths of the whole, the remainder being made up of "condiments." There can

be no doubt whatever that the nutritive materials which the compound contains are purchased at an enormous expense, and really does not pay for the purchase.

CALVES, Care of.—To raise good calves—those that will make good cows—they must be well fed from their birth, as it is impossible to stint a calf in food till 1 year—or more—old, and then bring the animal into as good condition, in all respects, as could be done if the animal had been well fed. Allow the calf to suck until the milk is fit to use. To learn it to drink, take the calf from the cow at the time mentioned, and fasten it with about 6 feet of rope in a box stall; then milk the cow, and standing off just far enough for the calf to reach you, wet one finger with milk, put it in its mouth, and gently lower your hand until it is immersed in the milk in the pail; let it continue to have the finger until it has received enough. This is lesson No. 1. The second lesson is given in this wise: Dip the finger in the milk and place it in its mouth, and when you have brought its mouth in contact with the feed, gradually withdraw your finger and the thing is done. It may be necessary to repeat this at the third time. The secret is that you must stand just far enough so that the calf can just reach the pail of feed, as the rope will then be taut, and hence he cannot reach you, or butt over and spill his milk or feed. It may be remarked in this connection, that calves will thrive better on milk that is not rich in butter than on what is commonly called very rich milk. The nutritive elements of milk reside chiefly in the casein. If you have a cow that gives particularly rich milk, and one that gives a quality poorer in butter, it is better in every way to feed the calf on the milk of the latter. The calf will thrive better, and you get more butter from the milk of the first cow.

CALVES, Lice and Vermin on.—The best applications to destroy lice, nits, etc., is a thorough application of alcohol or kerosene oil. Neither will do the animals any harm, and they are much better than ointment of any kind.

CALVES, To Cure Scours in.—Take 1 pint of red oak acorns, break the shells, and steep thoroughly in 3 pints of water, and you will have 1 quart of the tea. Give 1 pint of the same, warm, for the first dose, and the remainder 12 hours after, if necessary. I never knew more than 2 doses required to effect a cure.

HOLLOW HORN, or Horn Ail.—This disorder usually attacks cattle in the spring, after a severe winter; likewise those that are in very poor flesh, or those that have been overworked and exposed to severe storms, or reduced by any other diseases, are predisposed to take it. The symptoms are as follows: Eyes dull, discharging yellow matter, dizziness, loss of appetite, shaking of the head, bloody urine, coldness of the horns, stupidity and great debility. The remedies that are recommended are as numerous as they are contradictory. One authority advises boring gimlet holes in the horns 3 inches from the head, while another advises not to bore at all; one advises to bleed in the neck in the same manner as a horse is bled, while another deprecates bleeding. Another advises to put a mixture of strong vinegar, ($\frac{1}{2}$ a teaspoonful,) fine salt and ground black pepper, (of each a tablespoonful,) and, after allowing it to stand over night, to put a tablespoonful in each ear of the

animal affected. Another advises the cutting of the hair off the top of the head, and then pour or rub strong spirits of camphor thereon. And still another advises the pouring of the camphor in the ears. Where so many remedies and so much advice is offered, it is safe to say that not much is known of the real nature of the disease.

PIGS, How to Select Good.—The desirable points in a good pig are: Sufficient depth and length of body to insure suitable lateral expansion; broad on the loin and breast. The bones small and joints fine; legs no longer than, when fully fat, to just prevent the animal's belly from trailing on the ground when walking; feet firm and sound; the toes to press straightly on the ground and lie well together; the claws should be healthy, upright and even. The head small, the snout short, forehead somewhat convex and curving upward; the ears small but pendulous, somewhat inclining forward; light and thin. His carriage should be lively, sprightly, rather than dull and heavy; a lively bright eye, and he should carry his head up rather than down. Those colors which are characteristic of the best breed are to be chosen. The thinner the hair of a black pig the nearer allied it is to the Neapolitan, and consequently the less hardy, either to endure the cold and change of seasons, or to resist disease. White color indicates a connection with the Chinese. Mixed colors show marks of particular breeds; thus, if light or sandy, or red with black marks, the Berkshire blood is detected, etc.

PIGS, Blind Staggers in.—The cause of this disease is too high feeding. The cure is to withhold their food for a day or two, and feed them on very small quantities of sulphur and charcoal.

PIGS, Lice on.—Procure some leaf tobacco, and boil it to a strong amber in water enough to float it; mix in, while hot, enough of lard or refuse grease to make a thin salve; rub on the pigs or hogs troubled, and in less than 24 hours they will not have a louse on them, if thoroughly applied. Or get some crude petroleum oil and apply once a month, and no more lice will appear.

PIGS, MANGY.—Mange is a disease caused by the burrowing and breeding of a minute insect in the skin, like the itch in man, scab in sheep, etc. If pigs which have it, or have been exposed to it, are washed with carbolic or creosylic soap, and their pens and bedding sprinkled with the same, a cure is easily effected. More than one application might be required, and it would be best to wash the animals at the interval of a week.

RINGS, BULL, To Insert.—This can be done in three ways: 1. By burning the hole through with a pointed rod of iron heated in the forge, thus piercing and searing the wound at the same time.—2. By punching out the hole with an instrument like a leather punch of large size.—3. By piercing the gristle of the nose with a steel-tipped rod, (cold,) of which the point is formed with two cutting edges. Perhaps it may be an improvement to make the section of the end, just above the point, triangular, or in the shape of a four-pointed star. This last mode is said to be the preferable one. A point of iron about 3 inches long, and hollowed out at the large end, like the barrel of a key, to receive the

round end of the open ring, is used after the hole has been pierced, as a guide to the ring.

SHEEP, AGE OF, How to Tell.—The age of sheep may be known by examining the front teeth. They are 8 in number, and appear during the first year, all of a small size. In the second year the 2 middle ones fall out, and their place is supplied by 2 new teeth, which are easily distinguished, being of a larger size. In the third year, 2 other small teeth, 1 from each side, drop out, and are replaced by 2 large ones, so that there are now 4 large teeth in the middle, and 2 pointed ones on each side. In the fourth year, the large teeth are 6 in number, and only 2 small ones remain, 1 at each end of the range. In the fifth year, the remaining small teeth are lost, and the whole front teeth are large. In the sixth year, the whole begin to be worn; and in the seventh—sometimes sooner—some fall out and are broken.

SHEEP AND LAMBS, Care and Management of.—1. Keep sheep dry under foot with litter. This is even more necessary than roofing them. Never let them stand in mud or in snow.—2. Do not starve them during the winter, but by an abundance of food keep them in good condition. A more painful sight than the flocks of many farmers, near the close of the winter, cannot be witnessed. When a farmer has more sheep than he can properly keep or sell, he should kill the surplus when winter sets in, even if he should get nothing from them but the pelts.—3. Furnish an ample supply of water, convenient of access, during the winter months.—4. Always try to avoid letting any of your sheep or lambs have any sudden change of food.—5. Take up lamb bucks early in the summer, and keep them up until the December following, when they may be turned out.—6. Drop or take out the lowest bars as the sheep enter or leave a yard, thus saving broken limbs.—7. Count every day.—8. Begin feeding grain with the greatest care, and use the smallest quantity at first.—9. If a ewe loses her lamb, milk her daily for a few days, and mix a little alum with her salt.—10. Let no hogs eat with the sheep, by any means, in the spring.—11. Give lambs a little mill feed in time of weaning.—12. Never frighten sheep if possible to avoid it.—13. Furnish sow rye for weak ones in cold weather, if possible.—14. Separate all those that are weak, thin or sick from those that are strong, in the fall, and give them special care.—15. If any one of your sheep is hurt, catch it at once and wash the wound; and, if it is fly-time, apply spirits of turpentine daily, and always wash with something healing. If a limb is broken bind it with splinters, but not tight enough to interfere with the circulation of the blood.—16. Keep a number of good bells on the sheep.—17. Do not let the sheep spoil their wool with chaff or burrs.—18. Cut tag-locks in early spring.—19. For scours, give pulverized alum in wheat bran; prevent by taking great care in changing dry for green feed.—20. If one is lame, examine the foot, clean out between the hoofs, pare the hoof if unsound, and apply a wash of carbolic acid.—21. Shear at once any sheep commencing to shed its wool, unless the weather is too severe, and save carefully the pelt of any sheep that dies.—22. If sheep are given pine boughs once or twice a week they will create appetite, prevent disease, and increase their health.—23.

Their general health during the grazing season will be promoted by giving the sheep tar, at the rate of a gill a day for every 20 sheep. Put the tar in a trough, sprinkle a little fine salt over it, and the sheep will consume it with eagerness.—24. The best sheep to keep, both for wool and mutton, is the American merino.

SHEEP, STEERS, and Other Animals, Jumping Fences, To Prevent.—Various devices have been resorted to in order to prevent such trespasses, and especially in regard to sheep, but none have succeeded, or only in a limited degree. The following is a new one, and is not cruel or painful, and will not greatly discommode the animal operated upon, and is a remedy to the employment of which there can be no objection. It is to clip off the eyelashes of the under lids with a pair of scissors, and the ability or disposition to jump is as effectually destroyed as was Samson's power by the loss of his locks. The animal will not attempt a fence again until the eyelashes are grown.

SHEEP, CATARRH IN.—The following is asserted to be a sure cure for this disease. Take a quill from a hen's wing, immerse the feather end in spirits of turpentine, run it up the nostril of the sheep the whole length of the feather end, and twist it round before withdrawing it; wipe it off clean each time before immersing. One application will cure ordinary cases; the second or third, at intervals of 2 or 3 days, will cure the worst.

SHEEP-KILLING DOGS.—If sheep are kept in the same lot with cows or fat cattle dogs will not disturb them. As soon as the dogs approach they run to the cattle, who drive off the dogs. This plan will usually be found effectual, but an additional safeguard is to put a good sounding bell on one of the sheep. If a little strychnine is put on a piece of meat (if tainted, the better) and left in the yards or vicinity of the sheep in the evening, if there be any dogs around they will be in a condition for a *post-mortem* examination. An excellent way to trap sheep-killing dogs, is to place the sheep they kill, or at least one of them, where the dogs have left it; then put 4 or six lengths of fence around the dead sheep, made of sawed scantling. Commence by laying the scantling on the ground, and as you lay them up, draw your scantling in the width of them every time around, and build the fence high enough in this way that a dog can not jump it. Then lock the corners well, and you have a pen that dogs can go over into from the outside readily, and when once over, they cannot get out of it again until they are helped out. In this way, in a few nights, you will be quite likely to get the very same dogs that killed your sheep, as they will have the curiosity or desire to go over the ground the second time. It will be better to keep still about having your sheep killed, for if you make any search for the dogs you need not be at all surprised if you find that every man's dog is carefully shut up over night. It is not at all likely that the dogs will have had the blood stains washed from them, or any particles of wool removed from betwixt their teeth, on their return home in the morning, after having been out over night engaged in sheep-killing.

SHEEP, To Fatten for Winter.—Other things taken into consideration, large sheep fatten more easily and profitably than small sheep, and full

grown animals than those that have not reached maturity. Two-year-old wethers are the most profitable to fatten, and it is a matter of considerable surprise that so few of our farmers breed them. Sheep will fatten readily in winter on good clover hay alone; we do not mean the dark looking, burnt up stuff commonly called by that name, but what an English farmer would call "hay," cut when in full bloom, and cut in such a manner as to retain all its juices before they are turned into woody fibre, and of a good green color. A sheep of, say, 120 lbs. live weight, will consume 21 lbs. of clover hay per week, and increase in weight 2 lbs. Allowing that it would ordinarily consume 14 lbs. to keep it in good stationary condition, an expenditure of 7 lbs. of hay extra will produce $1\frac{1}{2}$ lbs. of mutton, worth, in the spring, 10 cents, so that the extra feeding is literally realizing to the farmer at the rate of nearly \$30 per ton for his hay. No other stock, we think, will give such a return for the trouble of fattening as this.

If it is desired to fatten sheep rapidly, the addition of a small quantity of oats to their food will be of great service; a gallon of oats once a day, among 20 sheep, will be a great help to fattening. Fattening sheep do not require very warm quarters—in fact, they will not bear close confinement, but their quarters must be dry, well ventilated, and abundantly littered with clean straw; they must be fed regularly, kept quiet, have access to water, and an occasional taste of salt. It will be found that when the weather is very cold they will require to consume somewhat more food than at other times, in order to counteract the waste of substance used in generating heat for their bodies, otherwise they will lose instead of gaining on cold or stormy days.

SHEEP, To Protect from the Gad Fly.—In August and September this fly lays its eggs in the nostrils of sheep, where they are hatched, and the worms crawl into the head, and very frequently they eat through to the brain. In this way many sheep are destroyed. As a protection smirch their noses with tar. Lay some tar in a trough or on a board, and strew fine salt on it—the sheep will finish the operation. The tar will protect them, and what they eat will promote their health.

SHEEP, FOOT-ROT IN, To Cure.—Causes—exposure in bad weather, but particularly from soft and low lands and wet pasturage. It never occurs on hard, mountainous districts. The best mode of cure is that by arsenic. The moment you perceive that any of your sheep have become lame, pass them through a trough containing a warm solution of arsenic of about the following strength: 4 ounces of arsenic, four ounces of soda ash or potash, 1 gallon of water; boil till dissolved; keep it about 3 inches deep, so as to cover the foot as the sheep walk through; the trough should be about 20 feet long, and just wide enough to admit 1 sheep walking after the other. 3000 sheep can be run through in about 3 hours; and this will result in a cure in every instance.

SHEEP, Hay Racks for.—The cheapest and best rack for sheep can be made of 8 boards (4 long and 4 short ones) nailed to 4 posts, forming an inclosure 12 or more feet long, as the case may be, and 32 inches wide. The bottom board should be at least 10 inches wide

and the top one need not be over 4, with a space between of from 6 to 8 inches, depending somewhat upon the size of the sheep that are to eat, standing with their heads thrust through this aperture.

SHEEP, Inflammation of Lungs in.—This disease is caused by wet and cold pastures, chills after hard driving, washing before shearing when the water is at too low a temperature, shearing when the weather is too chilly and wet, and other circumstances of a similar description. Its first indication is that of a fever, hard and quick pulse, disinclination for food, ceasing to chew the cud, unwillingness to move, slight heaving of the flanks, and a frequent and painful cough. The disease soon assumes a more aggravated form; but it is sufficient for the farmer to know the first stages of the malady, when he can pursue the course of treatment which experience determines best.

SHEEP, RED WATER IN.—To cure this complaint take of Epsom salts 1 ounce, linseed oil 1 ounce, gentian 1 drachm, ginger 1 scruple, warm water 2 ounces. For a lamb give $\frac{1}{2}$ of this amount, but to a full-grown sheep the entire quantity. Foment the abdomen with warm water—a lamb, in fact, may be placed altogether in a warm bath. In cases of recovery a change of food must be afforded, and a short, sweet pasture should be preferred.

SHEEP, RHEUMATISM IN.—This disease consists in a peculiar inflammation of the muscles of the body, very frequently causing considerable pain when they are called into action. It is usually caused by exposure to cold, and sometimes shifts from one foot to another, occasionally degenerating into a slow or chronic form, and attacking the sinews, ligaments, and joints, as well as the muscles. The neck and loins are the parts most frequently attacked, either separately or combined. The former affection causes the head to be carried in a bent position, and the latter produces considerable stiffness and weakness of the loins. The treatment should consist in removing the animal to a comfortable place, giving an active purgative, such as 2 ounces of Epsom salts dissolved in warm water, with a drachm of ginger, and $\frac{1}{2}$ an ounce of spirits of nitrous ether. A stimulant, such as hartshorn and oil, or opodeldoc, should be well rubbed over the affected part; and if the disease assumes a chronic form, a seton should be inserted near the part.

SHEEP, SCAB IN.—This disease closely resembles the itch in man, and is caused by a very minute parasite called the scab mite. These creatures find no dwelling-place on healthy, clean-skinned sheep; but when they do find the requisite conditions they multiply with astonishing rapidity, and spread through the flock, and from flock to flock. The females burrow in the skin, and make little sores, in or under which they deposit their eggs, which hatch, and in a short time go to work producing broods themselves. The sores thus caused run together and form scabs; they make an intolerable itching, and the sheep bite and scratch themselves fearfully, tearing out their wool in patches over their bodies. The disease is sometimes an epidemic, and through whole regions the flocks suffer so terribly that government action has been necessary to prevent their extinction. The suffering animals become more and more emaciated; their

wool falls off; their bodies are covered with nauseous scabby sores; their nervous system is incapable of sustaining the pain, and its functions, with those of the skin, being deranged, the digestive organs sympathize, and the sheep finally die. The remedies for the scab are numerous, but the best discovered is the use of a solution of sulphuret of lime, as practiced in Australia, and is made as follows: Take 100 lbs. of flour of sulphur, 50 lbs. of lime, (quick-lime, if possible, or a large proportion slaked,) and 100 gals. of cold water. Put these into a boiler. Keep them mixed by constantly stirring until they boil, and then keep boiling and stirring for about 10 minutes, until a clean, dark-brown, orange-tinted solution supervenes; then mix 1 gallon of this solution with 3 gallons of hot water, and make your dip or bath, heated to 100 or 114° of Fahrenheit, and plunge your sheep over head in it for about a minute. When they are dry the cure is complete; but to prevent the risk of reinfection, and to secure yourself against the chance of an imperfect muster, a second dip, after 10 days, in a bath of $\frac{1}{2}$ the above strength will render assurance doubly sure. This had better be done after the sheep is shorn; but even if the wool is long, it will not in the least degree injure the health of the animal or the fibre of the wool; but, on the contrary, by absorption it passes into and improves the constituents of the blood, and stimulates, through its action on the natural perspiration, the growth of the wool.

SHEEP, Directions for SHEARING.—The shearer may place the sheep on that part of the floor assigned to him, resting on its rump, and himself in a posture with his right knee on a cushion, and the back of the animal resting against his left thigh. He grasps the shears about half-way from the point to the bow, resting his thumb along the blades, which gives him a better command of the points. He may then commence cutting the wool at the brisket, and, proceeding downward, all upon the sides of the belly to the extremity of the ribs, the external sides of both sides to the edges of the flanks, then back to the brisket, and thence upward, shearing the wool from the breast, front, and both sides of the neck, but not yet the back of it, and also the poll, or forepart, and top of the head. Then "the jacket is opened," and its position, as well as that of the shearer is then changed, by the animal's being turned flat upon its side, one knee of the shearer resting on the cushion, the other gently pressing the fore-quarter of the animal to prevent any struggling. He then resumes cutting upon the flank and rump, and thence onward to the head. The sheep is then turned on the other side—in doing which great care is requisite to prevent the fleeces being torn; and the shearer proceeds as upon the other side. He must then take the sheep near to the door through which it is to pass out, and neatly trim the legs, leaving not a solitary lock anywhere as a lodging-place for ticks. It is absolutely necessary for him to remove from his stand to trim, otherwise the useless stuff from the legs becomes intermingled with the fleecewool. In the use of the shears, the blades must be laid as flat to the skin as possible, the points not lowered too much, nor should more than 1 or 2 inches be cut at a clip, and frequently not so much, but depending on the compactness of the wool.

SHEEP, STRETCHES IN.—A method that is recommended to cure this disease is as follows: Take 6 red peppers, boil them thoroughly, and give the juice, as hot as can be given, in doses of $\frac{1}{2}$ a pint at a time. This is to be followed by giving the sheep plenty of exercise by running them about the fields for 5 or 10 minutes.

SOWS NEAR FARROWING. *Treatment of.*—During the whole period of pregnancy sows should be moderately well fed, but not to produce too much fat, as this will reduce the number of the litter, or risk their being smothered by their unwieldy dam lying down on them. As farrowing approaches, the food must be semi-liquid or gently laxative, since costiveness at this period fosters fever, and hence sows devour their offspring. Gentle exercise is beneficial to all pregnant healthy animals, and for this the pen should be roomy. It is best to protect the sow against injury from other pigs. The pen should be airy and clean, and, until the last day or two of pregnancy, comfortably littered. As the time approaches, or when uneasiness, or the piling of litter for a bed, shows its near advent, clear out the pen, and cover it with a thin litter of chaff only. This is necessary to prevent smothering the pigs, particularly if the sow be large or fat. Soon remove the pigs when they are brought forth, helping them away until after the after-birth. In all circumstances the after-birth should be removed at once. However natural it may be for the wild animal to devour this, the practice, if permitted among domesticated swine, develops the propensity to devour their offspring. A drink of milk, gruel, or Indian or oatmeal and hot water will be at once grateful and supporting to the sow during and after parturition; and as soon as the secretion of milk is freely established, the diet should be abundant, soft and laxative. The pen should be kept clean. The litter of chaff should be of a limited amount for a week, until the pigs can be better able to protect themselves.

STEERS, How to Break.—It is best to begin with them as calves, and let the boys play with them, and drive them tied or yoked together, taking care they are not abused. When a pair of old steers are to be put together and broken to the yoke, or a pair of bulls, as not unfrequently happens, it is usually best to yoke them, and tie their tails together, in extempore stall, in a well fenced yard, and then turn them loose in the yard, which should not be large enough for them to run in and get under much headway. If the tails are not tied together, they will frequently turn the yoke, which is a very bad habit. After half a day's association, the lesson of "ye up it" and "whoa" may be inculcated and—these being well learned—probably the next day "haw" and "gee." The daily lesson should be given after they have stood yoked awhile. They should not be taken from the yard until they have become used to the yoke, and are no longer wild and scarey, as they are apt to be at first. Each day all previous lessons should be repeated. Put them before an ox sled or a pair of cart wheels at first, rather than to a stone boat, as they are apt to step on the chain, and that frightens them. All treatment should be firm but mild, and no superfluous words should be employed. If these directions are carried out, the result will be satisfactory.

HORSES.

BALSAM, WOUND.—Gum benzoin in powder 6 oz., balsam of tolu in powder 3 oz., gum storax 2 oz., frankincense in powder 2 oz., gum myrrh in powder 2 oz., socotorine aloes in powder 3 oz., alcohol 1 gal. Mix them all together and put them in a digester, and give them a gentle heat for 3 or 4 days, and then strain.

BALL, COUGH.—Pulverized ipecac $\frac{3}{4}$ oz., camphor 2 oz., squills $\frac{1}{2}$ oz. Mix with honey to form into mass, and divide into 8 balls. Give 1 every morning.

BALLS, DIURETIC.—Castile soap scraped fine, and powdered rosin, each 3 teaspoonfuls; powdered nitre 4 teaspoonfuls, oil of juniper 1 small teaspoonful, honey a sufficient quantity to make into a ball.

BALLS, FEVER.—Emetic tartar and camphor each $\frac{1}{2}$ oz., and nitre 2 ounces. Mix with linseed meal and molasses to make 8 balls, and give 1 twice a day.

BALL, PHYSIC.—Take 2 oz. of aloes, 1 oz. of turpentine, and 1 oz. of flour; make into a paste with a few drops of water, wrap in a paper, and give them with a bailing iron.

BALL, PURGATIVE.—Aloes 1 oz., cream tartar and Castile soap $\frac{1}{4}$ oz. Mix with molasses to make a ball.

BALL, WORM.—Assafetida 4 oz., gentian 2 oz., strong mercurial ointment 1 oz. Make into mass with honey. Divide into 16 balls. Give 1 or more every morning.

BAULKY HORSES, To Cure.—A man, in order to be able to control a horse, must first learn to control himself; for, as a rule, when a horse is patiently made to understand what is required of him, he becomes a willing subject. To attempt to force him to do what he does not understand, or to use the whip under such circumstances, only excites him to more determined resistance. One method to cure a baulky horse is to take him from the carriage, and whirl him rapidly round till he is giddy. It requires 2 men to accomplish this—1 at the horse's tail. Don't let him step out. Hold him to the smallest possible circle. 1 dose will often cure him; 2 doses are final with the worst horse that ever refused to stir. Another is to fill his mouth with dirt or gravel from the road, and he will at once go—the philosophy of this being that it gives him something else to think about.

BLISTER, LIQUID.—Take $\frac{1}{2}$ a pint of linseed oil, 1 pint of spirits of turpentine, and 4 oz. of aqua ammonia; shake well and it is fit for use. Apply every third hour until it blisters.

BIG LEG.—To cure, apply the above Liquid Blister every third hour until it blisters. In 3 days wash the leg with linseed oil. In 6 days wash it clean with soap and water. Repeat every 6 days until the swelling goes down. If there should be any callous left, apply spavin ointment.

BIG HEAD.—When this disease occurs, every care must be devoted to improving the general health. Let work be regular and moderate. Have the stable clean, dry, and well ventilated. Feed on sound hay and oats, either bruised or cooked. Withhold all Indian corn—above all if raw and hard. 4 or 5 lbs. of linseed cake may be given daily. Give every day, in the feed, 2

drachms of phosphate of iron, and 4 drachms of powdered gentian.

BIG SHOULDER.—See Big Head.

BREASTS, SORE.—This generally occurs in the spring, at the commencement of plowing. At times the fault is in having poor old collars, and not having the collar properly fitted to the horse's breast; and, at others, the hames are either too tight or too loose. There is a great difference in horses about getting chafed or galled, and at times it has seemed to be impossible to keep their breasts from getting sore; but a thorough application of strong alum water or white oak bark to the breast of the animal, 3 days before going to work, will toughen them so that they will not get sore. Another excellent plan is, when you let your team rest for a few moments during work, to raise the collar and pull it a little forward, and rub the breast thoroughly with your naked hand.

BREAKING DOWN.—The suspensory ligament is attached superiorly to the back part of the knee, and inferiorly to the back of the fetlock joint. It is elastic and gives springiness to the limb. In motion and in standing it passively supports the horse's fetlock. If this ligament is torn or cut across, the joint comes to the ground and the toe turns up; if severely strained, the fetlock descends unnaturally low. In breaking down, the fetlock is almost completely torn across, and the fetlocks come nearly or completely to the ground. Considerable swelling soon ensues above and behind the fetlock; there is great pain and symptomatic fever, and in severe cases the tendons are generally sprained. When the suspensory ligament is completely ruptured, and where the injury occurs in both fore legs, treatment need not be attempted. In severe cases the leg should be immersed in a pail of water, and kept in it for several days. When the pain and fever subside, wet bandages may be used. A dose of opening medicine should also be given. Bran mashes and hay should constitute the horse's diet at the first, and when pain and fever subside the diet may be more liberal. In bad cases a high-heeled shoe may be applied, or the horse may be slung so as to relieve the affected leg of weight.

BLOOD, Fulness of.—When this condition appears, the eyes appear heavy, dull, red or inflamed, and are frequently closed as if asleep; the pulse is small and oppressed; the heat of the body somewhat increased; the legs swell; the hair also rubs off. Horses that are removed from grass to a warm stable, and full fed on hay and corn, and not sufficiently exercised, are very subject to one or more of these symptoms. By regulating the quantity of food given to him, by proper exercise and occasional laxatives, a cure may soon be effected.

BOWELS, LOOSE.—In cases of chronic diarrhæa, a good remedy is to put powdered charcoal in the feed, and if the disease depends on a digestive function—the liver included—give a few doses of the following: Powdered golden seal 2 oz., ginger 1 oz., salt 1 oz. Dose— $\frac{1}{2}$ an oz. twice a day.

BOTTS.—Botts are the larvæ of the gad fly, of which there are 3 different kinds. The female gad fly, during the summer months, deposits her ova on the horses' legs or sides, and they become firmly attached to the hair. After remaining on the leg for some time, perhaps 4

or 5 days, they become ripe, and at this time the slightest application of warmth and moisture is sufficient to bring forth the latent larvæ. At this period, if the tongue of the horse chances to touch the egg, its operculum is thrown open, and a small worm is produced, which readily adheres to the tongue, and with the food is conveyed into the stomach, and therein is lodged and hatched. It clings to the cuticular coat by means of its ternacula, between which is its mouth; and in such a firm manner does it adhere to the lining of the stomach, that it will suffer its body to be pulled asunder without quitting its hold. Bots are often supposed to do a good deal of harm, but except in cases where they accumulate in very large numbers, we are of the opinion that they are almost harmless, because in ordinary cases they are chiefly attached to the cuticular coat, and the cuticular coat of the stomach is not possessed of a great degree of sensibility. Most horses that have been running at pasture during the summer months become affected more or less with bots, and their presence in the stomach is thus accounted for. When a horse is troubled with the bots, it may be known by the occasional nipping at their own sides, and by red pimples and projections on the inner surface of the upper lip, which may be seen plainly by turning up the lip. To remove them, take of new milk 2 quarts, molasses 1 quart, and give the horse the whole amount. 15 minutes afterward give 2 quarts of very warm sage tea, and 30 minutes after the tea give 1 pint of linseed oil, (or enough to operate as a physic.) Lard has been used, when the oil could not be obtained, with the same success. The cure will be complete, as the milk and molasses cause the bots to let go their hold, the tea puckers them up, and the oil carries them entirely away. The spring is the only season in which there is a chance to effectually remove them.

CATARACT.—This can be removed from a horse's eye with finely pulverized burnt alum, blown into the horse's eye through a goose quill. Or take oil of wintergreen, get a small glass syringe, and inject a few drops into the eye, and after 3 days repeat the application.

CATARRH, NASAL, or Corryza.—This malady is commonly known as a cold; it is an inflammation of the membrane lining the interior of the nose, and is observed in all the domestic animals. It occurs frequently after sudden changes in the temperature of the atmosphere, which checks or diminishes largely the action of the skin. In the early stage the animal is feverish; the membrane of the nose is dry and infected; the animal also frequently sneezes and coughs. There is a watery mucous discharge from one or both nostrils, which by degrees assumes a yellowish color. In young animals this affection is generally associated with swellings beneath the jaws. When the disease extends over a longer period than a fortnight it assumes a chronic type. *Treatment.*—Dissolve $\frac{1}{2}$ an oz. of nitre in a pint of water, and administer this to the patient daily, or it may be mixed with the water which the horse drinks. A bran mush should be given every other day. When the disease assumes a chronic form, which is seldom the case, injecting the nose with a weak solution of alum will remove the discharge. Young horses are very apt to

have swelled legs unless they get walking exercise for a short time every day. This is owing partly to the weakness of the circulation, and partly to a deteriorated state of the blood having been engendered during the horse's sickness.

CASTRATION.—A most important point to be considered is the proper time for the operation to be performed, and when that is satisfactorily decided, employ none other than a thoroughly competent individual to assume the duty. Very many of the defects observable in geldings are attributable to too early or too late a period of castration, and might have been, in a great measure, avoided by a judicious selection of the time suitable for its occurrence. A colt whose development will warrant his being cut at 5 or 6 months of age, will be in very slight danger from the operation; but few are so formed, much the larger number requiring a year's full growth to sufficiently perfect them, and others exceeding even that age. The withers, neck and shoulders are the most frequently deficient, and are parts that are most dependent upon castration for their proper appearance in the horse. The weather of late spring or early autumn will be found the most suitable time for castrating, when the air is dry and temperate. Upon no consideration should the animal, after being cut, be exposed to wet or inclement weather, or unsheltered from too hot a sun. Close confinement, or unlimited exercise, is equally prejudicial to an early and successful healing of the parts, and moderate liberty should in all cases be allowed the patient.

Speaking of the operation, Mr. Youatt says: "The old method of opening the scrotum (testical bag) on either side, and cutting off the testicles, and preventing bleeding by a temporary compression of the vessels, while they are being seared with a hot iron, must not, perhaps, be abandoned; but there is no necessity of that extra pain, when the spermatic cord (the blood vessels and the nerve) is compressed between 2 pieces of wood as tightly as in a vise, and then left until the following day, or until the testicle drops off." He also objects to the unnecessary pain inflicted upon colts by corping them, and states that it is accompanied with considerable danger. With regard to the method of castration by Torison, he adds: "An incision is made into the scrotum, and the *vas deferens* is exposed and divided; the artery is then seized by a pair of forceps contrived for the purpose, and is then twisted round 6 or 7 times. It retracts without untwisting the coils, and bleeding ceases, the testicle is removed, and there is no sloughing or danger. The most painful part of the operation, which is that of the firing-irons or the clamps is avoided, and the wound readily heals."

CLICKING.—This is noticeable by a disagreeable clicking noise made by the horse striking the toe of his hind shoe against the inner edge of the fore one. To prevent this annoying habit, shoe the hind foot short at the toe—that is to say, set the shoe as far back as is compatible with security and safety; the fore shoe should be forged narrow with the inner margin filed round and smooth.

COLIC.—*Symptoms:* The horse often lies down, and suddenly rises again with a spring; strikes his belly with his hind feet, stamps with his fore feet, and refuses every kind of food, etc. The following is said never to fail in curing cases

of colic: Aromatic spirits of ammonia $\frac{1}{2}$ an oz., laudanum $1\frac{1}{2}$ oz.; mix with 1 pint of water, and administer. If not relieved, repeat the dose in a short time. Another and a better remedy is to take a piece of carpet, blanket, or any thick material, large enough to cover the horse from his fore to his hind legs, and from the spine to the floor as he lies, and wring it out in hot water as hot as you can stand. You need not fear scalding the animal. Apply this to the horse, and cover it with a similar dry cloth. As soon as the heat diminishes much, dip the wet cloth again in hot water.

COLLAR, How to Fit a Horse.—An excellent plan, and one that will not injure the collar, is to dip it in water until the leather is thoroughly wet, then put it on the horse, secure the hames firmly, keeping it there until it becomes dry. It is all the better if heavy loads are to be drawn, as that causes the collar to be more evenly fitted to the neck and shoulder. If possible, the collar should be kept on from 4 to 5 hours, when it will be perfectly dry, and retain the same shape even afterwards; and as it is exactly fitted to the form of the neck, will not produce chafes nor sores on the horse's neck.

CORNS.—There are no fixed rules for the treatment of horses with corns. Corns occur to horses with the best of feet. The high-heeled and contracted quartered, the low as well as the broad, all occasionally become afflicted with this annoying disease, the common cause being the worst of shoeing. Success in the treatment of corns must rest entirely upon the intelligent understanding of the shoer. If he is master of the art, he will see at a glance what parts of the foot require to be removed. In the preparation of the foot, no matter what its form, so long as there is no reason to suspect suppuration, no "paring out the corn" should be permitted. When such officious exploration is permitted, the healthy condition of the whole foot is interfered with; the scooping out of the horn at the angle formed by the wall and bar interferes with the natural growth of these parts, causes them to tilt over and to press directly upon the seat of the corn, thus inflicting injuries which frequently terminate in suppuration. Let the horse's foot be properly adjusted in all its parts, always leaving as broad and level a bearing surface as possible. With regard to the shoe, unless the condition of the horse's foot requires some special modification for its protection, we prefer a plain shoe, a small clip at the toe, moderately broad web, and of uniform thickness from toe to heel.

COLTS, Their Care and Management.—Much harm arises from improper weaning. A good method is, when the colt is 4 or 5 months old, to put a strong halter upon him, place him in a stall, and put his mother in an adjoining stall, with a partition between, so arranged that they can see each other, and, if possible, get their heads together. The first day let the colt nurse twice—the next day once. Feed the mare upon dry hay and dry feed, and about half milk her 2 or 3 times a day until dry. Feed the colt upon new-mown grass or fine clover hay, and give him a pint of oats twice per day, and in about 2 weeks you will have your colt weaned, and your mare dry, and your colt looking as well as ever. When he is 1 year old he has as much growth and development of muscle as one 2 years old weaned in the usual manner. When

the mare becomes dry, colt and mare may be again turned in pasture. An opinion generally prevails among farmers that, from the time the foal is taken from its dam up to coming maturity, it should not be "pushed," as the saying is, nor fed on grain, for fear it would injure one so young and tender. This accounts for the great number of moping or spiritless and unthrifty colts, that are scarcely able to drag one leg after another. Their very appearance, cadaverous and pitiful looks, seem to convey to the mind of every sensible man that they are the victims of a wretched system of starvation, which enervates the digestive organs, impairs the secretions, and impoverishes the blood. Hence the deficiency in the development of bone and muscle. The muscles and tendons, being so illy supplied with material for growth and development, become very weak, and afford but little support to the bones and joints, so that the former become crooked and the latter weak—defects which no after feeding, no skill in training can counteract. It must be known to breeders that from the time of birth up to maturity, colts require food abounding in flesh-making principle, nitrogenous compounds—oats, corn, etc.; otherwise they must naturally be deficient in size, symmetry, and powers of endurance. Therefore they should be regularly fed and watered; and their food should consist of ground oats, wheat bran, and sweet hay, in quantities sufficient to promote their growth. Finally, proper shelter should always be provided for them. They should not be exposed, as they often are, to the vicissitudes of the weather, under the false notion of making them tough and hardy. Equally unwise is it to confine colts to close, unventilated, and filthy stables, deprived of light, exercise, and pure air. They should be groomed every day; a clean skin favors the vitalization of the blood. They should be permitted to gambol about as much as they choose. Exercise develops muscle, makes an animal active and spirited, and increases the capacity of the lungs and chest. By the above means, and proper attention to the principles of breeding, the business of raising colts may become both creditable and profitable.

COLT, To Prevent from Jumping.—Pass a good stout surcingle around his body; put on his halter, and have the halter strap long enough to go from his head, between his fore legs, then through the surcingle, and back to one of his hind legs. Procure a thill strap, and buckle around the leg between the foot and joint; fasten the halter strap in this—shorter or longer, as the obstinacy of the case may require. It is also useful to keep colts from running where there is likely to be danger from the result. If the thill strap should cause any soreness on the leg, it may be wound with a woollen cloth, and it would be well to change from one leg to the other occasionally.

COLT, CALLUS ON.—Take 1 oz. of bitter sweet, 1 oz. of skunk cabbage, 1 oz. of blood root; steep and mix with lard; make an ointment, and apply once or twice a day. This is considered a sure remedy.

COUGH.—Take powdered squills 1 oz., ginger 2 oz., cream of tartar 1 oz.; mix well, and give a spoonful every morning in bran. Another remedy is to give the animal a feed of sunflower seed.

CRIBBING.—There is supposed to be no

remedy for this habit, but a person who has tried it says that a horse can be cured of cribbing by nailing a sheepskin, wool side up, wherever there is any chance for the horse to bite.

DISTEMPER.—The treatment of distemper should consist in good nursing rather than active or officious medication. In the first instance the animal should, if convenient, be removed to a loose box, with extra warm clothing, flannel bandages to the legs, deprivation of grain, warm mashes, and a small quantity of damped hay. If the running at the nose is considerable, the throat very sore, and the cough troublesome, it will be advisable to wrap several folds of thick flannel around the throat, which should be kept constantly wet with alcohol, or weak camphor and spirit—that is, 1 part camphor dissolved in 16 parts alcohol. A dose of 4 drs. of either nitrate or sulphate of potass, dissolved in the drinking water, may be given once or twice each day. Active stimulants, particularly blisters, are wholly inadmissible. Demulcent drinks, such as linseed tea, hay tea, or oat or cornmeal, are useful and often acceptable. The animal should remain quiet in his box until all irritation in his throat has completely passed away. Even when the horse is "convalescent," the owner must not be in a hurry to get him into fast work, because the membrane of the larynx (upper portion of the windpipe) will continue to be for some time very susceptible of irritation and inflammation. In the advanced stages, if the debility is great and the appetite poor, much benefit is derived from the administration of tonics and stimulants. The following may be given daily: Iodide of iron 1 dr., extract of gentian 4 drs.; mix for to make 1 ball, or dissolve in a pint of ale and then give as a drink. In cases, however, which are progressing favorably, Nature had better be left to herself, and tonics should only be resorted to when the symptoms really indicate the need of them.

DRESSING HOOF.—A good preparation, and one that will give the horse's hoof a rapid and healthy growth, is to take of oil of tar 1 pt., beeswax 1½ lbs., whale oil 4 pts. The above ingredients should be mixed and melted together over a slow fire, and applied to all parts of the hoof at least once or twice a week.

EYE, Inflammation of.—Keep the horse quiet, and dress the eye repeatedly with the following lotion: Take of tincture of opium 2 oz., and of water 1 pt.; mix. Much depends upon a proper application of the lotion, and a most advantageous proceeding is to attach several folds of linen rag to the headstall so as to cover the eye, and by being repeatedly saturated it will keep up constant evaporation, as well as a cooling effect. The horse should also be removed from excessive light. When the inflammation has been subdued, the opacity—more or less of which is sure to remain—must be treated by the application of either iodide of potassium or nitrate of silver, prepared thus: Take of iodide of potassium 20 grs.; water 1 oz.; mix; or take of nitrate of silver 5 grs., distilled water 1 ounce; mix. To be applied daily by means of a camel's-hair brush saturated with the lotion and drawn gently across the eye.

FARCY.—In most cases farcy is indicated by the appearance of one or more pustules, which break into a very peculiar, deep, abrupt ulcer,

having thick inverted edges, which bleed freely on the slightest touch. The matter discharged from a farcy bud is either of a dirty, dingy yellow color or of a glue-like character; in either case it is offensive. Or it may be bloody or ichorous. In the latter case it abrades the surface on which it falls, or gravitates its irregular corded lines into the cellular tissues, and hence it helps to spread the disease. In other cases this complaint commences with a very painful swelling of the hind leg, followed by the peculiar intractable ulcers described above. In treatment, the horse should receive good care, fresh air, regular, moderate exercise, and be carefully kept apart from all others. Give daily in food for a fortnight 2 drs. of iodide of iron, 4 grs. of cantharides, with 2 drs. each of powdered ginger and aniseed. The ulcers or sores should be dressed daily with carbolic acid.

FEET, HORSES', Care of.—Every person may see, upon turning up the bottom of a horse's foot, an angular projection pointing towards the toe, termed the frog and its bars, the remainder or hollow part being technically called the sole, though the entire bottom of the foot might better receive this name. It is certain, however, that the "frog and sole" require pressure—a congenial kind of pressure without concussion—that shall cause the sensible, inside, or quick-sole to perform its functions of absorbing the serous particles secreted or deposited therein by the blood vessels. If the frog and its bars are permitted to remain in such a state as to reach the ground, wherever the sod happens to be soft or yielding, the hollow part of the sole receives its due proportion of pressure laterally, and the whole sole or surface of the foot is thus kept in health.

Every veterinarian of sense will perceive the necessity of keeping the heels apart, yet though the immediate cause of their contracting is so universally known and recognized, the injudicious method—to call it by no harsher name—of paring away the frog and sole, which prevents the bars from ever touching the ground, is still continued to an alarming extent.

So much for prevention. When disease comes on, which may be accelerated by two other species of mismanagement, another course is usually followed not less injudicious than the first mentioned original cause of all the mischief.

Horses' hoofs are of two distinct kinds or shapes—the one being oval, hard, dark-colored, and thick; the other round, palish, and thin in the wall or crust of the hoof. The first has a different kind of frog from the latter, this being broad, thick and soft, while the oval hoof has a frog that is long, acute and hard. The rags, which hard work and frequent shoeing occasion on the horny hoof of the round foot, produce ragged frogs also, both being thus pared away to make a fair bottom to receive the shoe—burning hot!—the whole support is so far reduced, and the sensible sole coming much nearer the ground, becomes tender and liable to those painful concussions which bring on lameness—principally of the fore feet. Contraction of those kinds of heels which belong to the cart-horse, and pommice-foot, are the consequence.

The oval foot pertains to the saddle-horse, the hunter, and bit of blood-kind, whose bold projecting frogs the farriers remove, and these being compelled to perform long and painful journeys,

ever starting or going off with the same leading leg, and continuing the same throughout, lameness is contracted in that foot, which none can account for, nor even find out whereabouts it may be seated. Applications of "the ovals" (that egregious compound of folly, ignorance and brutality) follow the first appearance of this lameness, and are made alike to the shoulder, the leg, and the sole, under the various pretences of rheumatism, strain in the shoulder, and founder. The real cause, however, is not once thought of, much less removed, but, on the contrary, the evil is usually augmented by removing the shoe and drawing the sole to the quick, perhaps, in search of suppositious corns, surbatings, etc.—pretended remedies that were never known to cure, but which might have been all prevented by the simplest precautions that can be imagined. These are:

1. Let the frog and sole acquire their natural thickness.

2. Lead off sometimes with one leg, sometimes with another.

3. Stuff the hollow of the hoofs (all four of them) with cow dung or tar ointment, changing it entirely once a day. In every case it is advisable that he be worked moderately, for it is useless to talk to the owners of horses about giving the afflicted animal an entire holiday at grass.

FEET, BRITTLE.—In a large majority of cases brittleness of hoof owes its origin to mismanagement of the feet, and especially to excessive moisture, the use of swabs, the bath-tub, etc. In all cases where the hoof is naturally brittle the feet should be kept dry rather than wet. If convenient, we would remove the shoes, and rasp the wall moderately short and round at its margin. Having cut the hair off short around the entire coronet, a little iodide of mercury ointment should be rubbed in. This will cause a rapid growth of horn. The horse should be kept during the day in a roomy box having a layer of tan or sawdust spread over the floor. When removed to his stall at night the feet should be washed clean, and, after being wiped dry, every part of the hoof should be freely anointed with the following composition: Take of oil of tar and beeswax of each 4 oz., honey and beef suet of each 2 oz., whale oil 8 ounces; melt the beeswax and beef suet first, then add the honey and other ingredients, stirring the whole until nearly cold. All sousing of the feet must be avoided.

FEET, CONTRACTED.—Horses which stand nearly or quite the year round, sometimes from year to year in the stable, are apt to have the feet get into a dry and fevered condition, the hoof becomes dry, hard, and often contracted, frequently also very brittle, and the horse sometimes suffers lameness in consequence. One of the most effective means of remedying these difficulties, where the horse cannot be spared to be turned loose into pasture for quite a season, is in the spring, when the ground is breaking up, and the winter's frost disappearing, and no lasting freeze is to be apprehended, to have all the shoes taken off, and drive the horse daily about business as usual without them. The roads remain muddy and soft, usually, so that a horse may be thus driven daily for a period of 3 or 4 weeks, and a great improvement is effected in the feet in every respect.

FEET, To Prevent Snow-balling.—Clean

their hoofs well, then rub thoroughly with thick soap suds before going out in the snow.

FISTULA.—Make a free opening in the lowest part of the sac, and inject it daily with a lotion containing 2 drachms of chloride of zinc to a pint of soft water.

FLIES ON HORSES.—As a preventive of horses being teased by flies, take 2 or 3 small handfuls of walnut leaves, upon which pour 2 or 3 quarts of cold water; let it infuse for one night, and pour the whole next morning into a kettle, and let it boil for a $\frac{1}{4}$ of an hour. When it becomes cold it will be fit for use. No more is required than to moisten a sponge, and, before the horse goes out of the stable, let those parts which are most irritable be smeared over with the liquor—namely, between and upon the ears, the neck, the flanks, etc. Not only the lady or gentleman who rides out for pleasure will derive pleasure from the walnut leaves thus prepared, but the coachman, the wagoner, and all others who use horses during the summer. Or take smart weed and soak it in water, and in the morning apply it to the horse, all over him, with a sponge. A decoction of quassia chips, made by boiling them in water, has also been recommended.

FRACTURE.—Severe lameness is sometimes caused by the fracture of 1 or 2 bones on the inside of the hoof—namely, the coffin of the navicular bone. Inclosed as these bones are on the inside of the hoof, and fenced in laterally by the cartilages, it is often difficult to detect, and we are obliged to depend on the general symptoms: the horse halts exceedingly, the foot is hot, and the pain extreme. As these bones are confined in the hoof no displacement can take place, therefore no *crepitus* can be detected. In all cases of fracture of either bone, a careful examination will, however, reveal the existence of a swelling at the back of the heels, immediately above the frog, and more or less fulness over the coronet of the foot. The treatment may be indicated in a few words—rest, absolute rest, is all-important. So long as the horse exhibits evidence of acute pain whenever his weight is imposed on the lame limb, the quieter he is kept the better. Warm baths, or cloths frequently moistened with a mixture of equal parts of alcohol and water, are useful adjuncts. It may be added that, in all cases of serious injury of the stifle, the hip-joint, or the pelvis, the horse is able to bring his heels "fair and square" upon the floor. In fracture of either the navicular or coffin bone, lameness sometimes continues long after recovery. It may turn out permanent.

FOOT, CANKER OF.—This complaint is a separation of the horn from the sensible part of the foot, and the sprouting of the fungus matter—proud flesh—instead of it, occupying a portion or even the whole of the sole and frog. It is the occasional consequence of bruise, puncture, corn, quittor and thrush, and is exceedingly difficult to cure. It is more frequently the consequence of neglected thrush than of any other disease of the foot, or rather it is thrush involving the frog, the bars and the sole, and making the foot one mass of putrefaction.

The cure of canker is a painful and tedious business. First, the extraneous fungus growth is to be removed with either the knife or caustic. Then the growth of fresh fungus must be discouraged, by bringing the foot into that state in

which it will again secrete healthy horn, by a slight daily application of the chloride of antimony, and that not where the new horn is forming, but on the surface which continues to be diseased, and accompanied by as firm but equal pressure as can be made; the careful avoidance of the slightest degree of moisture, the horse being exercised or worked in the mill, or wherever the foot will not be exposed to wet, and that exercise adopted as early as possible, and even from the beginning, if the malady is confined to the sole and frog. These means will succeed, if the disease is capable of cure.

FOOT, PUMMICE.—This is indicated by the hoofs spreading more and more and losing their shape. A properly constructed round (bar) shoe is the only reliable remedy, for it can be worn indefinitely without detriment to any part of the foot. The main object of treatment is to protect and preserve the deformed sole. The shoe must be chambered so as not to touch the sole, and no paring away of the latter must be allowed. Keep the feet clean and dry as possible.

FOOT, SAND CRACK IN.—This, as its name imports, is a crack or division of the hoof from above downward, and into which sand and dirt are too apt to insinuate themselves. It occurs both in the fore and the hind feet. In the fore feet it is usually found in the inner quarter, but occasionally in the outer quarter, because there is the principal stress or effort toward expansion in the foot, and the inner quarter is not so strong as the outer. In the hind feet the crack is almost invariably found in the front, because in the digging of the toe into the ground, in the act of drawing, the principal stress is in front. If the crack be superficial—does not penetrate through the horn—it will cause no lameness, yet must not be neglected. If the crack has extended to the sensible parts, and you can see any fungus flesh, with a small drawing knife remove the edges of the cracked horn that press upon it. Touch the fungus with caustic, dip a roll of tow or linen in tar, and bind it very firmly over it. The whole foot is to be kept in a bran poultice for a few days, or until the lameness is removed. A shoe may then be put on, so as not to press on the diseased part. The pledget of tow may now be removed, the crack filled with the composition, and the animal may be then turned into some soft meadow.

FOUNDER, To Cure.—Clean out the bottom of the foot thoroughly, hold up firmly in a horizontal position, and pour in a tablespoonful of spirits of turpentine, if the cavity will hold that much; if not, pour in what it will hold without running over; touch the turpentine with a red hot iron, (this will set it on fire;) hold the hoof firmly in this position till it burns out, and care must be taken that none runs on the hair of the hoof, lest the skin be burned. If all the feet are affected, burn turpentine in all of them. Relief will speedily follow, and the animal will be ready for service in a short time.—2. The seeds of the sunflower—a pint of the whole seed—given in his feed, immediately the founder is discovered.—3. By standing the foundered horse up to his belly in water.

GALLED BACK.—So soon as an abrasion is discovered on the back of a horse, the animal should be excused from duty for a few days; the abraded parts should be dressed twice daily with

a portion of the tincture of aloes and myrrh. This simple treatment will soon heal the parts. Should there be no abrasion, but simply a swelling attended with heat, pain and tenderness, the parts should be frequently sponged with cold water. Occasionally the skin undergoes the process of hardening (induration.) This is a condition of the parts known to the farriers of old as "sitfast," and the treatment is as follows: Procure 1 oz. of iodine, and smear the indurated spot with a portion of the same twice daily. Some cases of galled back and shoulders are due to negligence and abuse; yet many animals, owing to a peculiarity of constitution, will chafe, as the saying is, in those parts which come in contact with the collar, and neither human foresight nor mechanical means can prevent the same.

GLANDERS.—Glanders is a disease of very malignant type, and consists in a discharge from one or both nostrils of matter which, by transfer or inoculation, will produce the disease in any other animal. It is also characterized by tumefaction of the submaxillary and lymphatic glands. The lymphatic glands enlarge, a pustular eruption appears upon the skin, followed by suppurating, bloody, gangrenous ulceration in various parts, giving rise to small tumors known as farcy buds. These gradually suppurate, and secrete a specific virus. The physiology and pathology of it is this: It occurs under 2 forms—namely, glanders and farcy. Many veterinarians have considered these varieties to be distinct diseases, but numerous experiments have demonstrated that they have their origin in the common animal poison. It appears, however, that there are 2 grades or varieties of this disease. Thus, if glanders be defined to be a disorder with a running of matter from the nose, enlargement and induration of the glands, farcy consists in the formation of a number of tumors on different parts of the body, which soften and ulcerate. It may be shortly stated that, in the primary stage of glanders, the nasal passages especially suffer, while in farcy it is the lymphatic system which is first affected. The catalogue of remedies proposed is endless. Sulphate of copper, sulphate of iron, cantharides, arsenic, and recently sulphate of soda and carbonic acid, have been used, but without benefit, and to the disappointment of the hopes which had been entertained of them. The disease is pronounced incurable by standard authorities, and an animal having it should be killed, rather than experimented on.

GRAVEL.—Steep a $\frac{1}{2}$ lb. of hops in a quart of water, and give it as hot as the horse can stand it.

GREASE.—This is a white, offensive discharge from the skin of the heels. Wash the part well with warm soap-suds twice a day, and if the swelling be great apply a poultice to it; when the sores are cleansed touch them with a rag or feather dipped in a solution of chloride of zinc, 1 grain to the ounce of water.

HAIR, LOSS OF.—To promote the growth of hair, where the skin has been deadened by bruises or rubbing, take of quinine 8 grs., finely powdered galls, 10 grs., powdered capsicum 5 grs., oil of almonds and pure lard of each 1 oz., oil of lavender 20 drops; mix thoroughly, and apply a small quantity to the denuded parts 2 or 3 times a week. Where there is falling out of the hair of the mane and tail, take glycer-

ine 2 oz., sulphur 1 oz., acetate of lead 2 drs., water 8 oz. To be well mixed, and applied by means of a sponge.

HALTER-PULLING.—A new way to prevent horses pulling at the halter, is to put a very small rope under the horse's tail, bringing the ends forward, crossing them on the back, and tying them on the breast. Put the halter strap through the ring, and tie to the rope in front of the breast. When the horse pulls, he will, of course, find himself in rather an uncomfortable position, and discontinue the effort to free himself.

HARNESS, Care of.—First take the harness apart, having each strap and piece by itself, and then wash it in warm soap-suds. When it has been cleaned, black every part with the following dye: 1 oz. extract of logwood, 12 grs. of bichromate of potash, both pounded fine; put it into 2 quarts of boiling rain water, and stir until all is dissolved. When cool it may be used. You can bottle and keep for future use if you wish. It may be applied with a shoe-brush, or anything else convenient. When the dye has struck in, you may oil each part with neat's-foot oil, applied with a paint-brush, or anything convenient. For second oiling use $\frac{1}{2}$ castor oil and double that quantity of neat's-foot oil, mixed. A few hours after wipe clean with a woollen cloth, which gives the harness a glossy appearance. The preparation will not injure the leather or stitching, makes it soft and pliable, and obviates the necessity of oiling as often as is necessary by the ordinary method.

HEAVES.—This disease is indicated by a short, dull, spasmodic cough, and a double-jerking movement at the flank during expiration. If a horse suffering from this disease is allowed to distend his stomach at his pleasure, with dry food entirely, and then to drink cold water, as much as he can hold, he is nearly worthless. But if his food be moistened, and he be allowed to drink a moderate quantity only at a time, the disease is much less troublesome. To cure this complaint, feed no hay to the horse for 36 or 48 hours, and give only a pailful of water at a time. Then throw an armful of well cured smart weed before him, and let him eat all he will. In all cases where the cells of the lungs are not broken down, great relief, if not a perfect cure, will follow. Another remedy is sunflower seed, feeding 1 or 2 quarts of the seed daily.

HIDE-BOUND.—To recruit a hide-bound horse, give nitrate potassia (or saltpetre) 4 oz., crude antimony 1 oz., sulphur 3 oz. Nitrate of potassia and antimony should be finely pulverized, then add the sulphur, and mix the whole well together. Dose—A tablespoonful of this mixture in a bran mash daily.

HOOF-BOUND.—Cut down several lines from the coronet to the toe all around the hoof, and fill the cuts with tallow and soap mixed; take off the shoes, and (if you can spare him) turn the animal into a wet meadow, where his feet will be kept moist. Never remove the sole nor burn the lines down, as this increases instead of diminishing the evil.

HOOF-QUARTER, CRACKED.—Many plans have been devised by which to heal a quarter crack—such as scoring with a knife, blistering, cutting with a sharp, hot iron, riveting and the like, all which, in many cases, have proved a failure. If the following directions are adopted,

the fore feet will be sound in 3 months. Above the crack, and next to the hair, cut with your knife an incision $\frac{1}{2}$ inch long, crosswise of the crack, and about $\frac{1}{4}$ inch deep. Now from the incision draw a line $\frac{1}{4}$ inch each side, parallel with the crack, down to the shoe; then with your knife follow those lines, and cut through the enamel or crust of the foot. Now there is a piece of the crust to be taken out. This is done by loosening the top of the piece next to the hair with your knife, then with your forceps take hold of the piece and pull it off; that leaves a space of $\frac{1}{2}$ inch of the crust taken out from the hair down to the shoe. Fill the cavity with tar, and lace on a soft piece of leather to keep the tar in its place.

Keep the animal quiet for 3 or 4 days, and he is ready to drive, but it is best not to use him until the foot is perfectly sound. Shoe with a bar shoe, leaving some spring to the heel, so it will not bear hard upon the weak quarter, and in 3 months you will have a sound foot.

HORSES, How to Judge and Select.—*Color.* Light sorrel or chestnut with feet, legs, and face white, are marks of kindness. A deep bay, with no white hair, will be a horse of great bottom, but a fool, especially if his face is a little dished. They are always tricky and unsafe. A black horse cannot stand the heat, nor a white one the cold. The more white about the head the greater his docility and gentleness. *Eye.*—If broad and full between the eyes, he may be depended on as a horse for being trained to anything. *Ears.*—Intelligent animals prick up their ears when spoken to; vicious ones throw their ears back. *Face and Neck.*—Dish-faced horses must always be avoided, and a broad forehead, high between the ears, indicates a very vicious disposition; while a long, thin neck indicates a good disposition; contrawise, if short and thick; the nostrils of a good horse should be large.

HORSE, Points of a Good.—He should be about $15\frac{1}{2}$ hands high; the head light and clean made; wide between the nostrils, and the nostrils themselves large, transparent and open; broad in the forehead; eyes prominent, clear and sparkling; ears small and neatly set on; neck rather short, and well set up; large arm or shoulder, well thrown back, and high; withers arched and high; legs fine, flat, thin and small-boned; body round and rather light, though sufficiently large to afford substance when it is needed; full chest, affording play for the lungs; back short, with the hind-quarters set on rather obliquely. Any one possessing a horse of this precise make and appearance, and weighing 1100 or 1200 lbs., may rest assured he has a horse of all work, and a bargain well worth getting hold of.

HORSE, (Cart,) Points of a Good.—A well-shaped head, rather large; a long, clean ear, full eye, neck rather long, but not too much arched; strong withers, lying well forward to catch the collar at the proper angle for draught, and broad shoulders well spread into the back; back very straight, ribs long and well rounded, hind legs bent at the hock, forelegs forward, hind-quarters somewhat round, but not sufficiently so to make them look short; the mane and tail of strong, but not coarse hair, and with a fetlock about 2 inches long; broad knees, long hocks, short shanks, and hard ankles or fetlock joints, and round hoofs, well opened behind; and the near-

er you can approach this description, the nearer the horse will be to perfection.

HORSES, AGE OF, By Teeth.—A horse has 40 teeth—24 double teeth, or grinders, 4 tushes, or single file teeth, and 12 front teeth, called gatherers. As a general thing, mares have no tushes. Between 2 and 3 years old, the colt sheds his 4 middle teeth—2 above and 2 below. After 3 years old 2 other teeth are shed, 1 on each side of those formerly changed; he now has 8 colt's teeth and 8 horse's teeth; when 4 years of age he cuts 4 new teeth. At 5 years of age the horse sheds his remaining colt's teeth, 4 in number, when his tushes appear. At 6 years of age his tushes are up, appearing white, small and sharp, while a small circle of young growing teeth is observable. The mouth is now complete. At 8 years of age the teeth have filled up, the horse is aged, and his mouth is said to be full. *By Eyelid.*—After a horse is 9 years old, a wrinkle comes on the eyelid, at the upper corner of the lower lid, and every year thereafter he has 1 well-defined wrinkle for each year over 9. If, for instance, a horse has 3 of these wrinkles, he is 12; if 4, he is 13. Add the number of wrinkles to 9, and you will invariably judge correctly of a horse's age.

HORSE'S EYES, To Test a.—To test a horse's eyes, look at the eye carefully, when the horse is in rather a dark stable. Note the shape and size of the pupil carefully, carry this in your mind while you turn the horse about to a strong light. If the pupil contracts and appears much smaller than in the first instance, you may infer that the horse has a good strong eye; but if the pupil remains nearly of the same size in both cases, his eyes are weak, and you had better have nothing to do with him.

HORSES, WHEN UNSOUND.—Any of the following defects constitute unsoundness in a horse:

Lameness of all kinds and degrees. Diseases of any of the internal organs. Cough of every kind, as long as it exists. Colds or catarrhs, while they last. Roaring, broken wind, thick wind, grease, mange, farcy and glanders; megrims or staggers, founder, convex feet, contracted feet, spavins and ringbones, enlargement of the sinews or ligaments, cataracts and other defects of the eyes, impairing sight.

The following may or may not occasion unsoundness, according to the state or degree in which they exist: Corns, splints, thrushes, bog-spavins, through pins, wind-galls, crib-biting. Curbs are unsoundness unless the horse has worked with them for some months without inconvenience.

Cutting, particularly speedy cutting, constitutes unsoundness when it cannot be remedied by care and skill. Quidding, when a confirmed habit, injures the soundness of a horse.

Defects, called blemishes, are: Scars from broken knees; capped hocks, splints, bog-spavins, and through pins; loss of hair from blisters or scars, enlargements from blows or cutting, and also specks or streaks on the corner of the eye.

Vices are: Restiveness, shying, bolting, running away, kicking, rearing, weaving, or moving the head from side to side, stringhalt, quidding, slipping the halter.

HORSES, Care of.—The man having the care of horses should be the embodiment of patience.

His temper should always be under perfect control. He should never inflict any unnecessary pain, for it is only by the law of kindness that a horse can be trained and managed. No man ever yet struck a horse, but that he made the horse the worse for it. Patience and kindness will accomplish in every instance what whipping will fail to do. Horses having a vicious disposition are invariably made so from cruel treatment.

Horses are designed to work, and daily labor for them is as much a necessity to their existence as to that of man's. It is not the hard drawing and ponderous loads that wear out horses, and make them poor, baulky and worthless; but it is the hard driving, the worry by rough and inhuman drivers, that uses up more horse flesh, fat and muscle than all the labor a team performs. Another great reason why there are so few really sound animals, is because of their being put to work so soon. Horses are not developed until they are 5, 6 or 7 years old, and they should do very little work until they reach that period.

When a horse is worked hard its food should chiefly be oats; if not worked hard, its food should chiefly be hay; because oats supply more nourishment and flesh-making material than any other kind of food; hay not so much.

HORSES, Food for.—Horses are usually fed thrice daily—namely, in the morning, at mid-day and at night. It is not possible to state the exact quantity of food a horse requires to keep him in good working condition. In all cases the horse himself tells whether he is getting too much or too little. The best feed for ordinary road horses is hay and oats. 10 lbs. of hay is a fair allowance of good hay, and to fast-working horses from 15, 20, or 25 lbs. of oats; one-third of the hay may be given during the day, the balance at night. Horses differ so much in the quantity of hay they may eat without inconvenience—in fact, they vary so much in size, age, breeding, temper, condition, and labor they are called upon to perform, that it is impossible to fix upon any specific rules for feeding them.

Oats should be bruised for an old horse, but not for a young one, because the former, through age and defective teeth, cannot chew them properly; the young horse can do so, and they are thus properly mixed with the saliva and turned into wholesome nutriment. Carrots given occasionally will give a fine, silky appearance to the coat, and experiments have shown that the best way to feed carrots is to give them with oats. If you are in the habit of feeding 4 quarts of oats to a mess, give 2 of oats and 2 of sliced carrots, and the result will be more satisfactory than if each were fed separately. Youatt writes of the carrot: "This root is held in much esteem. There is none better, nor perhaps so good; when first given it is slightly diuretic and laxative, but as the horse becomes accustomed to it these effects cease to be produced. They improve the state of the skin. They form a good substitute for grass, and an excellent alternative for horses out of condition. To sick and idle horses they render grain unnecessary. They are beneficial in all chronic diseases connected with breathing, and have a marked influence upon chronic cough and broken wind. They are serviceable in diseases of the skin, and, in combination with oats, they restore a worn horse more than oats alone.

It is also advantageous to chop hay fed to a horse, and to sprinkle the hay with water that has salt dissolved in it—a teaspoonful of salt to a bucket of water is sufficient. Rack-feeding is wasteful. The better plan is to feed with hay (chopped) from a manger, because the food is not then thrown about, and is more easy to chew and digest.

Vetches and cut grass should always be given in the spring to horses that can not be turned out into the fields, because they are very cool and refreshing, and almost medicinal in their effects; but they must be supplied in moderation, as they are liable to ferment in the stomach, if given largely.

As often as once a week a change of food should be made—one feed of cut hay and meal, or cut hay with shorts will do. Musty hay on no account should be fed to horses. Let the food be the best of its kind, for in the end it is the cheapest.

HORSES, Water for.—Water is usually given 3 times a day; but in summer, when the horse sweats much, he should have water 4 or 5 times; under ordinary circumstances, 2 rules will guide the attendant. The first is, never to let the horse get very thirsty; the second, to give him water so often and in such quantity that he will not care to take any within an hour of going to fast work. The quantity of water which a horse will drink in 24 hours is uncertain; it varies so much that 1 will drink quite as much as other 2 or 3. It is influenced by the food, the work, the weather, and the number of services; the demand for water also increases with the perspiration. Horses at fast work, and kept in hot stables, need a large allowance, which must be still larger in hot weather; horses of slow work may be permitted to take what quantity they please; but to those of fast work occasional restriction is necessary. Restriction is always necessary before fast work. A few quarts given an hour before going to work ought to suffice. Water should always be given before rather than after grain. Water your horses from a pond or stream rather than from a spring or well, because the latter is generally hard and cold, while the former is soft and comparatively warm. The horse prefers soft, muddy water to hard water, though ever so clear.

HORSE-FEEDING ON THE ROAD.—Many persons, in traveling, feed their horses too much and too often, continually stuffing them, and not allowing them time to rest and digest their food; of course they suffer from over-fullness and carrying unnecessary weight. Horses should be well fed in the evening, and must not be stuffed too full in the morning, and the traveling should be moderate on starting when the horse has a full stomach. If a horse starts in good condition, he can go 20 or 25 miles without feeding.

HORSES, CLEANING.—When brought in from work, warm with exertion, the horse must be rubbed down and then blanketed; but we would not blanket a horse in a good stable, as a general rule, except in extremely cold weather. A sharp-toothed curry-comb is the dread of a fine-skinned horse, and the brush and straw wisp answer the same purpose much better, if used as frequently as they should be. Mud should not be allowed to dry on the legs of a horse; it is the cause of half the swelled legs, scratches,

and other affections of the feet with which they are afflicted.

HORSES, Stables for.—The floor of the stable should be level, or nearly so. When it is inclined it causes the horse to hang back, because the incline causes his loins and hind parts to ache intolerably, and he hangs back in order, if possible, to get his hind legs beyond the gutter, thus diminishing, by many degrees, his standing up hill. The best bedding is that of straw, fine shavings from a planing mill, or sawdust—pine sawdust being best, and oak sawdust the worst. They should be allowed to stand on the naked floor as little as possible. "If I were asked," said a noted stock-raiser, "to account for my horses' legs and feet being in better order than those of my neighbor, I should attribute it to the four following circumstances: First, they are all shod with a few nails, so placed in the shoe as to permit the foot to expand every time they move. Second, that they all live in boxes, instead of stalls, and can move whenever they please. Third, they spend 2 hours daily in walking exercise, when they are not at work. Fourth, that I have not a head-stall or trace-chain in my stable. These four circumstances comprehend the whole mystery of keeping horses' legs fine, and their feet in sound working condition up to old age.

HORSE STABLES, To Deodorize.—Sawdust, wetted with sulphuric acid, diluted with 40 parts of water, and distributed about horse stables, will, it is said, remove the disagreeable ammoniacal smell, the sulphuric acid combining with the ammonia to form a salt. Chloride of lime slowly evolves chlorine, which will do the same thing, but then the chlorine smells worse than the ammonia. Sulphuric acid, on the contrary, is perfectly inodorous. The mixture must be kept in shallow earthenware vessels. The sulphuric acid used alone, either diluted or strong, would absorb more or less of the ammonia, but there would be danger of spilling it about, and causing serious damage; and, beside this, the sawdust offers a large surface to the floating gas.

HORSES, BLANKETING.—In reference to blanketing horses in winter, it is doubtless true that blanketing keeps a horse's coat smoother in winter, and hence fine carriage horses and saddle horses will continue to be blanketed. But where horses are kept more for service than for show, we think they had better dispense with the blanket. Keeping them constantly covered makes them tender and liable to take cold. It is better to give them a warm stable, and plenty of straw for bedding, and good food. When they are to stand for any length of time out of doors in a cold winter's day, they should have blankets. And so when they come in from work steaming hot, they should be allowed to stand a short time until they have partially cooled off; then the blankets should be put on for an hour. Be careful and not delay putting on the blanket until they have become chilled.

HORSES, POOR, How to FATTEN.—Many good horses devour large quantities of hay and grain, and still continue thin and poor. The food eaten is not properly assimilated. If the usual feed has been unground grain and hay, nothing but a change will effect any desirable alteration in the appearance of the animal. In case oil meal cannot be obtained readily, mingle

a bushel of flaxseed with a bushel of barley, 1 of oats, and another bushel of Indian corn, and let it be ground into fine meal. This will be a fair proportion for all his feed. Or the meal or barley, oats and corn, in equal quantities, may at first be procured, and $\frac{1}{4}$ of oil cake mingled with it when the meal is sprinkled on cut feed. Feed 2 or 3 quarts of the mixture 3 times daily with a peck of cut hay and straw. If the horse will eat that amount greedily, let the quantity be gradually increased, until he will eat 4, 5 or 6 quarts at every feeding, 3 times a day. So long as the animal will eat this allowance, the quantity may be increased a little every day. But always avoid the practice of allowing the horse to stand at a rack well filled with hay. In order to fatten a horse that has run down in flesh, the groom should be very particular to feed the animal no more than he will eat up clean and lick his manger for more. Follow the above suggestions and the result will be satisfactory.

INTERFERING.—To prevent interfering in a horse who is turned out in the front feet, the shoe should be applied to fit closely on the inside, and the nails applied round the toe and to the outside. In some instances a small piece of leather placed betwixt the sole and the shoe, and allowed to project outwards, has a very good effect in preventing interfering.

ITCH.—To cure a horse affected with itch, first reduce his daily allowance of food, putting him on a low diet, and then give him a teaspoonful of a mixture of equal parts of sulphur and antimony, and at the end of a week or 10 days the sores will have disappeared, and the horse will be covered with a fine coat of new hair.

KIDNEYS, Inflammation of—(Nephritis.)—Symptoms: Gradual loss of flesh, pain across the back, impaired action of the hind extremities, and the frequent passing of urine, which is very highly colored. In treating this affection, the horse should be allowed perfect rest, and he should also have a generous diet of easily digested food, and plenty of mucilaginous drinks. The loins may be rubbed every third or fourth day with mustard, and 1 drachm of tartar emetic given every night. This medicine can be conveniently administered mixed with the food.

KICKING IN STALL.—To prevent your horse from kicking in the stall, fasten a short trace-chain, about 2 feet long, by a strap to each hind foot. A better way is to have the stalls made wide enough so that the horse can turn in them easily. Close them with a door or bars, and turn the animal loose. After a while he will forget the habit, and stand tied without further trouble.

KNEE-PAN, DISPLACED.—Feed the horse well on oats, barley and sound hay; give him a drachm of powdered phosphate of iron daily in his food; keep in a stall with a perfectly smooth and level floor, and not less than $5\frac{1}{2}$ or 6 feet wide; apply a shoe with a bar welded to the toe, projecting 2 or 3 inches, and then let it be turned up; rub the joint with an ointment made of 1 drachm of powdered cantharides to $\frac{1}{2}$ an oz. of lard, repeating the application next day if it has not blistered. When a blister rises, wash it off with soap and warm water, and then anoint the part daily with lard, until the scab and other effects have passed off, when another blister may be applied.

KNEE-SPRUNG.—The best remedy for

knee-sprung or contracted tendons is a winter's run in a straw yard, or a summer's run at grass.

LAMPAS.—This consists in a swelling of the first bar of the upper palate. It is cured by rubbing the swelling 2 or 3 times a day with $\frac{1}{2}$ an ounce of alum and the same quantity of double refined sugar mixed with a little honey.

LEGS, Inflammation and Swelling of.—Rest, and the application of an active blister to the swollen parts, will effect a cure. No better blister can be used than the following: Take resin and black pitch each 4 parts, beeswax 3 parts, sweet oil 11 parts, Spanish flies 6 parts, euphorbium 2 parts. Melt the resin, pitch and wax first, then add the oil, and when thoroughly mixed remove from the fire; lastly, add very slowly the powdered flies and euphorbium. Before the blister is applied the hair should be cut close off, and the skin, if scurfy, washed with Castile soap and warm water, after which it must be thoroughly dried, and the blistering ointment rubbed in for 10 minutes. After applying the blister, the horse's head should be tied up to prevent his biting the part, or rubbing it with his nose. At the expiration of 2 or 3 days most horses may be set at liberty. In about a week rub sweet oil over the blistered part.

LEGS, BROKEN, To Cure.—Instead of summarily shooting the horse, in the greater number of fractures it is only necessary to partially sling the horse by means of a broad piece of sail or other strong cloth, placed under the animal's belly, furnished with 2 breechings and 2 breast-girths, and, by means of ropes and pulleys attached to a cross beam above, he is elevated or lowered, as may be required. By the adoption of this plan every facility is allowed for the satisfactory treatment of the fractures.

LINIMENT, BLISTERING.—See "Legs, Inflammation and Swelling of."

LINIMENT for the Galled Backs of Horses.—White lead moistened with milk. When milk is not to be procured oil may be substituted. 1 or 2 oz. mixed at a time will be sufficient for a month.

LINIMENT for Bruises, Sprains, etc.—Take 1 pint of alcohol, 4 oz. of Castile soap, $\frac{1}{4}$ oz. of gum camphor, $\frac{1}{4}$ oz. of sal ammoniac. When these are dissolved, add 1 oz. of laudanum, 1 oz. of origanum, $\frac{1}{2}$ oz. oil of sassafras, and 2 oz. spirits of hartshorn. Bathe freely.

LINIMENT, NERVE AND BONE.—Take beef's gall 1 qt., alcohol 1 pt., volatile liniment 1 lb., spirits of turpentine 1 lb., oil of origanum 4 oz., aqua ammonia 4 oz., tincture of Cayenne $\frac{1}{4}$ pt., oil of amber 3 oz., tincture of Spanish flies 6 oz. Mix.

MOON EYE.—Moon Eye is a term applied to remittent inflammation of the eyes of the horse. From the remittent or periodical appearance of this disease, it has been supposed that it recurred monthly, or with special changes of the moon—hence the name Moon Eye and Moon Blinding. It is constitutional, hereditary disease, localizing itself in the eyes. This malady attacks alike the young and the aged, the fat and the lean, while the high bred and the mongrel, the lazy and the nervous, are all equally prone to its baleful influence. Certain kinds of eye—especially the small sunken eye—seem disposed to contract the disease. Of all the influences tending to the development of Moon Eye, none is more clearly established than the hereditary pre-

disposition. During its prevalence the animal is almost entirely useless.

MOUTH, SORE.—Symptoms: The mare runs water, the horse cuds, or throws hay out of his mouth. The cause of this disease is either from frosted bits being put into their mouths by eating poisonous weeds. To cure, take borax 3 drachms, 2 drachms of sugar of lead, ounce of alum, 1 pint of vinegar, 1 pint of tea. Shake all well together, and wash the animal's mouth out every morning. Give him hay for 12 days.

THE MULE.—There seems to be but little doubt that mules are more economical than horses for farm purposes. The climate, soil, and mode of carrying on farming operations in the prairie regions of the West are all admirably suited to the working of horses. One combination of circumstances renders oxen the favorite team of New England; another causes mules to be employed in the South; and still another makes horses the most desired farm team in the Northwest. If we take into consideration the beauty of form and carriage, speed and docility as well as strength, no animal employed in the service of man can compare with the horse. For many purposes where elegance and speed of little consequence, the horse is not an economical animal to use. The cost of keeping him is greater than is the case with the mule; his ability to disease is very much greater, and years of available labor are less. The expense of shoeing mules is much less than that of shoeing horses, on account of the smallness of the feet, the hardness of the hoof, and its freedom from disease.

MULE, Splint on.—To remove these blemishes, the treatment consists in repeated blistering. Having first cut the hair short, a little of the following ointment into the skin covering the splint, every night, until a free and healthy discharge is produced from the surface. Take of biniodide of mercury 2 drachms, lar 1 oz. Mix. If, after an interval of a fortnight the splint does not appear much reduced in size the ointment should be re-applied and repeated at similar intervals.

NASAL GLEET—or running at the nose can be cured by taking $\frac{1}{2}$ a lb. of rosin, $\frac{1}{2}$ a lb. of blue vitriol, and 4 oz. of ginger, grinding them all fine, and giving the horse a spoonful 2 or 3 times a day.

NAVICULAR DISEASE.—Symptoms: It prevents tension of the injured parts the horse points his foot. Pointing is also observed in corns and in bruises and injuries of the heel, but long-continued pointing is to be dreaded as harbinger of incurable lameness. Lameness first is often slight, and disappears after $\frac{1}{2}$ hour's work, from increased secretion of synovia. In lifting his foot the horse bends his knee less than natural, and—especially when first brought out—walks on his toe; the toe of the shoe wears rapidly, while the heel exhibits very slight wear. The horse steps or moves in a stilty way. In from 4 to 8 weeks the hoof becomes deeper, narrower at the heels; the sole becomes very concave, and the foot appears narrower than the sole than at the coronet. When the hoof is especially the elastic and insensible for to bear weight, it becomes absorbed, and the sole consequently contract, and the sole becomes This is most among horses used on hard

and paved streets; rapidity of action is the cause in a great many instances. *Treatment*.—In such cases the practice of paring the quarters almost to the quick is adopted. The toe is shortened, and the feet are enveloped in poultices for 10 days, renewing the poultice twice a day. The horse should be fed on bran and oats scalded, with a moderate allowance of hay. Give a dose of opening medicine at the end of 10 days; blister the coronet, and keep the hoof moist with wet cloths. The sole may now be thinned, and the horse kept standing on wet sawdust, and a second blister may be at the same time applied. When the horse is shod for work a leather sole should be applied, and the space between the foot and sole stuffed with tar and tow. Turning the horse into a damp pasture for 6 weeks will be attended with benefit. In a great many instances this disease is incurable.

OINTMENT, HOOFF.—Take $\frac{1}{2}$ a lb. of lard and 4 oz. of rosin. Heat them over a slow fire until melted; take the pot off the fire, add 1 oz. of pulverized verdigris; stir well to prevent a foam running over. When partially cool add 2 oz. of turpentine. Apply it from the hair down 1 inch. Work the horse all the time.

OINTMENT, SLOAN'S.—Rosin 4 oz., lard 4 oz., turpentine 4 oz., honey 2 oz. Melt these articles slowly, gently bringing to a boil; and, as it begins to boil, remove from the fire and slowly add a little less than a pint of spirits of turpentine, stirring all the time this is being added, and stir until cool.

OVER-REACHING.—Make the shoe its natural length, or a trifle longer—with the calk of the forward shoes high and the heel calk low. The hoof will then stand further forward, and be more removed from the stride of the hind foot, which, being shod with a low toe calk and high heel calk, will strike the ground before it reaches the fore foot. An interfering horse generally strikes with the inside of the hoof, about 2 inches from the toe; therefore make the shoe straighter on the inside, and rasp the hoof accordingly.

PALSY.—An attack of this kind is frequently followed by wasting of the affected muscles—they lose their rounded form, and present a more or less withered aspect. The most common causes of this disease are idleness and plethora. It may result from accidental violence, as blows or falls. *Treatment*.—First, apply a blister over the loins. Then give the mare one of the following pills every morning for 8 or 10 days: Take gentian and ginger of each 2 drachms, linseed meal 4 drachms, strychnine 5 grains. Mix with water for 1 pill. The diet should be light, and the mare kept quiet in the stable, or—better—a box stall.

PHYSIC BALL.—Barbadoes aloes 4, 5 or 6 drs., (according to the size and strength of the horse,) tartar of potassa 1 dr., of ginger and Castile soap of each 2 drs., anise or peppermint 20 drops; pulverize, and make all into 1 ball with thick gum solution. Before giving a horse physic, he should be prepared for it by feeding scalded bran, in place of oats, for 2 days at the least, giving also water which has the chill taken off, and continue this feed and drink during its operation. If it should not operate in 48 hours, repeat $\frac{1}{2}$ the dose.

PNEUMONIA, ACUTE.—*Symptoms.*—They are first taken with a dry, depressed cough, loss of appetite, but thirsty; pulse feeble, but

frequently the extremities are cold—sometimes when first taken, at others they retain their natural heat until the disease assumes its worst appearance, and then the legs become cold. Respiration is very active and laborious; the animal pants all the time, stands with fore legs widely separated, never lies down, and is loth to move. Some discharge copiously from both nostrils a thick, slimy matter, sometimes mixed with blood—in that case the whole body is excessively hot, and the extremities also, but other symptoms the same. The treatment in the early stage of this disease should be: 1. An abundant supply of cool, fresh air. 2. Abstinence from grain or corn. 3. Extra clothing and warm bandages to the legs. In all cases it is desirable that the patient should at once be removed to an airy, loose box. If these simple remedies do not bring about a subsidence of the attack within a short time, recourse must be had to medical treatment.

POLL EVIL.—If there is only swelling and slight tenderness, but without any fluctuation or pressure from contained matter, give the horse as a laxative 5 drs. of Barbadoes aloes, and rub the poll actively with an ointment made by mixing equal parts of mercurial and iodine ointments. Repeat this application, if necessary, to induce some blistering action. If matter is already formed, as indicated by the fluctuation or pressure, the swelling should be at once opened so as to let it escape. An opening should then be made from the very lowest point of the sac, so that the matter may flow freely as soon as formed. If obstinate, it may be injected several times a week with a lotion containing $\frac{1}{2}$ a dr. of chloride of zinc to a pint of water.

POLL EVIL (Norwegian Cure.)—Cover the head and neck with 2 or 3 blankets; have a pan or kettle of the best warm cider vinegar; then hold it under the blankets; steam the parts by putting hot stones, brick or iron into the vinegar, and continue the operation until the horse perspires freely; do this for 3 mornings, and skip 3, until 9 steamings have been accomplished.

POLL EVIL and FISTULA.—Common potash $\frac{1}{4}$ oz., extract of belladonna $\frac{1}{2}$ dr., gum Arabic $\frac{1}{4}$ oz. Dissolve the gum in as little water as practicable; then, having pulverized the potash, unless it is moist, mix the gum water with it and it will soon dissolve; then mix in the extract and it is ready to use; it can be used without the belladonna, but it is more painful without it, and does not have quite as good an effect. The best plan to get this into the pipes is by means of a small syringe, after having cleansed the sore with soap-suds; repeat once in 2 days, until all the callous pipes and hard fibrous base around the poll evil or fistula is completely destroyed.

POWDERS, CONDITION.—2 oz. resin, 2 oz. saltpetre, 2 oz. black antimony, 2 oz. sulphur, 2 oz. saleratus, 2 oz. ginger, 1 oz. copperas. 1 tablespoonful to a dose once a day for 3 days; then skip 2 or 3 days, and give again until you have given in this way 9 doses, or even more if you like. It should be given in the spring and fall, or at any time when the animal is not doing well.

POWDERS, CLEANSING.—Take of ginger 2 oz., 4 oz. fenugreek, 1 oz. black antimony, and 2 oz. rhubarb. Grind all fine, mix it well, and it is fit for use. Give a large spoonful every

morning and night. It gives a good appetite, and fine coat and life to the animal.

QUITTOR.—The treatment of this disease is as follows: After the shoe has been removed, thin the sole until it will yield to the pressure of the thumb; then cut the under parts of the wall in an oblique direction from the heel to the anterior part, immediately under the seat of complaint, and only as far as it extends, and rasp the side of the wall thin enough to give way to the pressure of the over-distended parts, and put on a bar-shoe rather elevated from the frog. Ascertain with a probe the direction of the sinuses, and introduce into them a saturated solution of sulphate of zinc, by means of a small syringe. Place over this dressing the common poultice, or the turpentine ointment, and renew the application every 24 hours. 3 or 4 such applications will complete a cure. It is recommended that when the probe is introduced, in order to ascertain the progress of cure, that it be gently and carefully used, otherwise it may break down the new-formed lymph.

HORSE, How to Ride a.—The body of the rider is divided into 3 parts, of which 2 are movable and 1 immovable; 1 of the first consists of all the upper part of the body down to the waist, the other of the lower part of the legs, from the knee down. The immovable portion is from the waist to the knees. The rider should sit perfectly square on the middle of the saddle, the upper part of the body presenting a free and unconstrained appearance, the chest not very much thrown forward, the ribs resting freely on the hips, the waist and loins not stiffened, and thus not exposed to tension or effort from the motions of the horse; the upper part of the body should lean slightly to the rear, rather than forward; the thighs, inclining a little forward, lie flat and firmly on the saddle, covering the surcingle, of which only a small part behind the knee should be seen; the lower part of the leg, hanging vertically from the knees, touches the horse, but without the slightest pressure; the toes are pointed up without constraint, and on the same line with the knees, for if the toes are turned outward it not only causes the horse to be unnecessarily pricked by the spurs, (if worn,) but the firmness of the seat is lost; the heels should be seven-eighths of an inch below the toes, and the stirrups so adjusted that when the rider raises himself on them, there may be the breadth of 4 fingers between the crotch and the saddle; to make this adjustment, when the rider has acquired a firm and correct seat he should without changing that seat, push the bottom of the stirrup to the hollow of the foot, and then, with the foot horizontal, feel a slight support from the stirrup; when this is accomplished he replaces the foot properly in the stirrup, and the heel will then be seven-eighths of an inch below the toes.

To give the rider a correct seat, the instructor, having caused him to mount, seizes the lower part of his leg, and stretches it straight toward the fore-quarters of the horse, so as to bring the buttocks of the rider square on the saddle; then resting one hand on the man's knee, he seizes the lower part of the leg with the other, and carries back the thigh and knee so as to bring the crotch square on the saddle, the thighs covering the surcingle, the lower part of the leg, from the knee down, also over the surcingle, and

sees that the rider does not sit too much on his crotch, but has his buttocks well under him. He then explains to the rider that the firmness of the seat consists in this: that the rider grasps the horse with his legs; that both thighs press equally upon the saddle, in conformity with the movements of the body, and that the general movements of the body and thighs must conform to those of the horse. He should be taught, too, how to hold the feet, without allowing him to place them in the stirrups, for this is one of the most essential conditions for a good seat.

RINGBONE.—This disease is generally caused by heavy draught, especially in up-hill work. The first appearance of the complaint is indicated by a hard swelling upon the top of the fetlock or pastern joint, accompanied by tenderness, pain, heat, etc. Cooling appliances, such as cold water, soap, camphor, etc., with a little laudanum, should be promptly applied, giving the animal perfect rest, with green food or roots in connection with hay—no grain. This may be followed by some convenient preparation of iodine, like an ointment of iodide of lead and lard. Rub in the ointment well, and follow up the treatment for several weeks. If the case is an obstinate one, try blistering with cerate or cantharides, continuing, at intervals, the use of the iodine. Equal parts of turpentine and kerosene would, no doubt, form a most excellent wash—the crude coal oil would be better than that which has been refined. Rub it well into the hair around and above the hoof.

RINGBONE REMEDIES.—Pulverized cantharides, oils of spike, origanum, amber, cedar, Barbadoes tar, and British oil, of each 2 oz.; oil of wormwood 1 oz., spirits of turpentine 4 oz., common potash $\frac{1}{2}$ oz., nitric acid 6 oz., oil of vitriol (sulphuric acid) 4 oz., and lard 3 lbs. Melt the lard and slowly add the acids; stir well and add the others, stirring until cold. Clip off the hair, and apply by rubbing and heating in; in about 3 days, or when it is done running, wash off with suds and apply again. In old cases it may take 3 or 4 weeks, but in recent cases 2 or 3 applications will cure.—2. Take $\frac{1}{2}$ pint spirits of turpentine, $\frac{1}{2}$ oz. blue stone, $\frac{1}{2}$ oz. of red precipitate. Shake well and use every morning; and keep the hoof well greased. This will not only take off the hair, but cause a severe blister, which, after healing, if there still be signs of lameness, repeat the remedy.

RINGWORM.—Wash the parts with a very strong infusion of bayberry bark, wipe dry, and then smear the denuded spots with a mixture of 4 oz. of pyroligneous acid, 1 oz. of turpentine, the washing and dressing to be repeated until healthy action is established. If the disease does not readily disappear, give sulphur, cream of tartar and sassafras, equal parts, in a dose of 6 drachms daily. If the disease still lingers, sponge the denuded parts with tincture of muriate iron.

ROARING.—This is a loud sound which some horses emit during the act of breathing, and is caused by a diminution in the diameter, or by a distortion of the windpipe, or by a wasting of the muscles of the larynx, and imperfect opening of the latter. It is incurable.

RUNAWAY HORSES, To Prevent Injuries from.—This can be done by electricity. A complete electric apparatus can be purchased in a small case. Let one of these be fixed in an

out-of-the-way nook in the carriage, 2 wires to hook to harness, beneath which have 2 very thin copper plates properly placed. In the event of a runaway, the driver and inside occupants will only have to press a glass knob to stop instantly the mad career of the strongest horses.

RUPTURE.—Rupture or hernia is the protrusion of a bowel, or some other part, from its proper cavity. It is sometimes congenital, and may then be reduced at the same time that castration is performed. At other times rupture may be produced by blows, kicks or falls. A hernia is dangerous to life when it becomes compressed or strangulated by a stricture at the orifice of protrusion. Skillful surgical aid should always be obtained in any such case at once. But sometimes, in the absence of a veterinarian, any one may restore the gut by introducing the hand into the bowel and drawing it up; the other hand, at the same time, making gentle pressure upon the swelling in the abdomen. No violence should ever be used in attempting this; and the bowels should first be emptied by a clyster.

SCRATCHES.—If a horse's blood is pure he will not have the scratches. Give him a tablespoonful of saltpetre every day for 15 days, and be careful about his taking cold while feeding it. It opens the pores so that he will take cold very easy. Along with this take pure, dry white lead, pure oxide of zinc, and glycerine, of each $\frac{1}{2}$ an oz.; fresh lard (free from rancidity) 1 $\frac{1}{2}$ oz. Mix the white lead, oxide of zinc and glycerine to a uniform, smooth paste, then add the lard, a little at a time, till a uniform, smooth ointment is formed. Wash the parts with Castile soap and water, and dry with a cloth, then apply the ointment 2 or 3 times daily with the fingers. Wash once in 2 or 3 days, and dry the spot well before dressing again.

The horse should stand on a plank floor kept clean and dry; and if used, all dust, sand and dirt should be washed off so that the affected parts may remain clean. If these directions are strictly carried out, it will seldom, if ever, fail to cure the very worst cases within a reasonable time.

SHOEING HORSES.—Few horseshoers understand thoroughly the anatomy of the horse's foot. The great mistake is made in attempting to trim the hoof to fit the shoe, whereas the shoe should be made to fit the hoof. Very little trimming is needed if the shoe is made right. The frog should never be touched by the buttress, if the foot is healthy, as Nature has intended that to be the spring or cushion to first receive the blow when the foot is set down on the road, to guard the knee and shoulder from the concussion.

Nothing can be more barbarous than the carving and cutting of a horse's foot before shoeing, though on his skill in this many a farrier prides himself. The idea that the frog must not be allowed to bear on the ground—that the sole must be thinned till it "springs on the thumb," is a most pernicious one.

As you value your horse, do not let the blacksmith even scrape the dirt off the frog. It would be better if he could not see it, because, if anything fit to be called a frog, he will beg, argue, and try every means to persuade you to let him cut it. Do not turn your back to him while he has the foot in his lap and knife in his hand, or else off comes a portion of the frog. If the

frog is left to itself it will, when Nature gets ready, shed itself; but the difference between shedding and cutting is, that before shedding the under frog is protected by a suitable covering, but when cut it is exposed to the action of the air and water, which causes it to crack, leaving those "rags" which the blacksmiths love so well to cut. Do not open the heels, as it increases the resistance offered to contraction.

The summer shoe needs to present a flat surface to the ground. Make it of the same width and thickness from the toe to the heel. Have the seating deep, so as to prevent the sole pressing upon the shoe as it descends. Have a clip at the toe to prevent the shoe slipping back, but none at the sides, as they not only destroy too much of the hoof, but prevent expansion. Have the fullering deep to receive the nail-heads, and have the nail holes straight—neither inclined inwardly or outwardly. Have only 5 nails to hold on the shoe—2 on the inner, and 3 on the outside. Place the 2 on the inner side about 1 $\frac{1}{2}$ inches from the top; those on the outside may be placed further back toward the heel. The reason is, that when the foot strikes the ground it expands to relieve the horse of the shock of his weight, and the inner side being thinner than the outside, the expansion is greater. By placing the nails far back we prevent that expansion, thereby cramping the foot, which makes the animal step short and quick, like one with tight boots. If we take an old shoe, we find at the heels that it is worn down, and also that it is smaller and bright, which is not done by the shifting of the shoe, as you only find it at the heels, by the action of the foot while expanding and contracting. Of course, this action wears upon, but the foot is continually growing.

On fitting the shoe, do not let it burn the foot, as it makes a strong foot brittle, and on a weak one hurting the horse. Be sure it fits close to the foot. Bring in the heels, as they do not, but the nails prevent expansion. Do not get the nails larger than necessary; bring them out low down in the crust, and make the clinchers very broad. Rasp below but not above the clinchers, as the foot above is covered—if healthy—with a varnish which excludes the air and water.

The hind shoe need not be so broad, but a little higher at the heels. In this put 7 nails, as the hind legs propel and the front legs receive the weight.

The winter shoe needs toe and heel pieces to prevent the horse from slipping. Have the inner cork not quite so sharp as the outer one, so that if he steps upon the other foot it will not cut it.

The outside of the hoof ought not to be at all touched by the rasp, save at the very edge, as rasping tends to thicken the hoof and make it coarse and clumsy. Shoes should be made just as light as they possibly can be to answer the purpose. Ordinarily they are $\frac{1}{4}$ too heavy. A horse's hoof should be carefully cleaned every day, and oiling the hoof once or twice a week is recommended.

SPAVIN.—Take $\frac{1}{2}$ oz. oil of amber, 1 oz. oil of spike, 2 oz. spirits of turpentine, $\frac{1}{2}$ oz. nitric acid. The acid must be put into the bottle last. Apply this mixture thoroughly, and though it will not remove the bunch—the lameness will generally disappear. If the horse is over 4 years old, you will fit a bar of lead just

above it, wiring the ends together so that it will constantly wear upon the enlargement, and the two together will cure 9 cases out of every 10 in 6 weeks.

SPAVIN CURE.—Take 1 oz. of origanum oil, 1 oz. of British oil, 1 oz. of oil of spike, 1 oz. oil of wormwood, 1 oz. gum myrrh, 1 gill of alcohol. Put the oils together; put the gum in the alcohol, and let it stand for 24 hours, and then add it to the oils; shake well before using; apply it to the parts affected, and rub it in well with the hand, or heat it in with a hot iron. If it is applied for a sprain, use it morning and evening. Wash clean once in 3 days.

SPLINT.—When a splint does not occasion lameness it need not be interfered with. To cure, take volatile liniment (of the U. S. Dispensatory) to which add 1 dr. of oil of origanum. Apply this thoroughly twice a day, followed by rubbing the splint with a round pine or bass wood stick, as hard as can be done without abrading the skin. This treatment should be continued several weeks, when it will be discovered that the splints will grow less and finally disappear.

SPRAINS, General Treatment of.—Rest is the first requirement. Next apply wet bandages until the heat is abated, and until there is no pain on pressure; then rub with some simple ointment.

STAGGERS.—This is a functional disorder of the brain, which, when once it has declared itself, is said to be beyond cure. The following prescription may be tried. Give a mess twice per week composed of 1 gal of bran, 1 tablespoonful of sulphur, 1 spoonful of saltpetre, 1 quart of boiling sassafras tea, 1 1/4 oz. assafetida. Keep the horse from cold water for 1/2 a day afterwards.

STRANGLES.—Feed with light, cooling (green if it can be had) food; mix the food with sassafras tea, in which a spoonful of powdered sulphur and a teaspoonful of saltpetre have been added.

STIFLE-STEPPING, To Cure.—1/2 a tea-cup of vinegar, the whites of 2 eggs, a piece of alum the size of a chestnut, well beaten, dissolved and warmed. Twitch and knee-strap the fore leg standing off from the affected member. Apply with the hand and rub it in well; saturate a piece of flannel 6 inches square, place it over the joint, cover this with a double thickness of the same, long enough to lap behind the leg, and draw it very tight. Now take a very hot flat-iron and iron it, being cautious not to blister your horse too severely. Turn him out, and in 1 week repeat; in the meantime bathe the parts with a decoction of white-oak bark.

SWEENEY.—A horse is said to be sweenied when the muscles of the shoulder appear to have perished away, and the skin seems to be attached closely to the shoulder-blade. These symptoms may arise from chronic lameness in the foot or other part of the limb. In such case, of course it is of no use to apply remedies to the shoulder. Cure the foot, and the shoulder will come right, although stimulants and rubbing will expedite it. But genuine sweeny is quite different from the above, although the appearances are the same. It is caused by hard drawing in a collar that is too large; or where no whiffletree is ever used, but the traces are hitched directly to the thills, as in "jumpers," as they are called; or

by jumping fences, or the like. The presence of real sweeny may be discovered by moving the horse in a circle, or causing him to step over bars, when you can generally determine the seat of the lameness. For such cases irritants with friction, is the proper treatment. Blistering liniment, or seton, or a piece of leather inserted under the skin, will cure, with rest.

TAMING AND TRAINING.—Many persons pay for instructions in training horses, and yet they nearly all fail, simply because, with all the instructions in the world, they cannot handle a horse—it is not in them. To be a successful trainer you must have a sympathy with the horse and a personal power of control. That which partakes of the power necessary to subdue and train, you will find in your own mind, your own love, will and wisdom. If you have little or no instinctive love for the horse, of course you are not the person to control him. Men and women are often found who are said to have the natural gift of controlling the horse; they love horses from instinct, as it were. The secret in these cases consists in their intense love for the horse. If you love the horse, you will, you can, but know how to make the horse love you. Love, in all grades of animals, has its appropriate language; and when this language is addressed to the horse, it excites love, of course. A blow with a whip or club does not come from love, but from combativeness, and it excites combativeness or fear in the horse. If you want to make a horse love you, (and you must cause him to love you if you control him,) why of course you must love him and treat him accordingly. Study the character of your horse—not the nature of horses in general, but of the horse that you wish to control. Horses differ in their dispositions as really as men do, and each one is to be approached, attracted, pleased and controlled accordingly. *To Make Him Lie Down.*—First, catch your horse, then strap the near fore leg up round the arm of the animal; lead him about on 3 legs until he becomes tired or weary; he will then allow you to handle him anywhere; then attach a strap with a ring to the off fore-fetlock; to this ring fasten another strap, which being brought over the horse's back to the near side, is put through the ring on the off fore fetlock; return the end of the strap to the near side, still keeping fast hold, and move the animal on, and pull; he will then be thrown upon his knees, when, after struggling for some time, by gentle usage he will lie down. After unloosing the straps, put him through the same process as before, when the horse will lie down whenever required. Uniformity is necessary in our method. It is by the repetition, by the constant recurrence of certain motions, words or actions, that we succeed. Many fail for the want of uniformity in their method. They are loving and kind by spells; then they are harsh and cruel. The horse is "impressed," as it is said, with his master's wishes, when those wishes are often and uniformly expressed in motions, words and actions! If man needs "precept upon precept, line upon line, etc., in order to learn his lessons well, how much more true is this of the horse, which is below man in consciousness and the reflective faculties. *Teaching Him to Pace.*—Buckle a 4 lb. weight around the ankles of his hind legs, (lead is preferable;) ride your horse briskly with these weights upon his ankles, at

the same time, twitching each rein of the bridle alternately; by this means you will immediately throw him into a pace. After you have trained him in this way to some extent, change your leaded weights for something lighter; leather padding, or something equal to it, will answer the purpose; let him wear these light weights until he is perfectly trained. This process will make a smooth and easy pacer of any horse.

To Make Him Trot.—The secret consists in using rollers on the front feet. These rollers are made of pieces of wood or horn turned round, as big as a hickory nut, with a gimlet hole bored through the centre of each, and about 12 of them strung on a string or narrow strap, (which should be much smaller than the hole,) and then tied or buckled very loose around the fetter-lock joint next to the hoof, so that they will play loose up and down when the horse is in motion. As soon as the horse finds something on his feet, he will lift them up higher and throw them out further and handsomer; this he will soon learn permanently. Another secret is that a small or medium sized flat is the best, and far superior to the track system for teaching the horse or colt to gather quickly. A very light skeleton or gig should be used in training. *To Sit on his Haunches.*—First learn the horse to obey you, so that when you say "Ho!" he will remain still. Then, having learned him to lie down, let him get up on his fore legs, and then stop him. The horse gets up in this way, and you have only to teach him to hold his position for a while. It does not strain the horse to sit, and you must always use the word "sit" in connection with the feat. Also the word "down" when you wish him to fall. *To Make Him Follow You.*—Take your horse to the stable, put on a surcingle and a bridle with short reins, which may be checked up a little and fastened to the surcingle. Then lead him about a few times, and letting go the bridle continue to caress him, as you constantly say, "Come along." If he lag, give him a light cut behind with a long whip. Continue this until you succeed. Do not forget the element of "love" in this as well as other feats. *To Teach Him to Pick Up a Handkerchief.*—Spread on the sawdust a white cloth containing a liberal supply of oats; lead the animal round the ring, and let him take some of the oats. This is lesson No. 1—its object being to fix in the horse's mind a connection between the cloth and the oats. The march round the circle being once or twice repeated, he stops at the handkerchief as a matter of course. By dint of practice—say a couple of weeks—he will learn to stop as readily in a trot or a gallop as in a walk. After a time the handkerchief must be doubled over and tied in a knot; the animal shakes it to get at the grain, but not succeeding, lifts it from the ground, which is just the thing wanted. When the horse has done this a few times, and finds that, though he can shake nothing out, he will receive a handful of oats as a reward, he may be trusted to perform in public. The last step of all—persuading the horse to carry the handkerchief to his owner—is easily done. Of his own accord he will hold the cloth till it is taken from his mouth, and there will be little difficulty in coaxing him to walk a few steps—when he knows that he will get a handful of oats or a carrot for his obedience. *Teaching Him to Walk.*—For every-day use, the most

economical gait for a horse is a fast walk; and yet not half the thought is given to this essential that there is to other things that secure to the horse a name rather than intrinsic value. Colts can be taught to walk fast by following them for a half day together (some one leading) with a small switch, starting them, when inclined to go slow, into a quicker pace. After they are harnessed keep fast walking in mind, and when on level ground, or going up a hill with a very light load, urge them to their utmost, until 4 miles an hour becomes a habit. *Teaching Him to Stand.*

—Take your horse on the barn floor, and throw a strap over his back and fasten it to his right fore foot; lead him along and say "Whoa," and at the same time pull down the strap, which will throw him on 3 feet, and make him stop suddenly. This is the best way known to teach "Whoa," though you can put on the war bridle, and give him a sharp jerk that will stop him about as soon as the strap to his foot. Then put him in harness, with the foot strap, as directed under the head of "Training to Harness," and drive him up to the door. The moment he undertakes to move, take his foot and say "Whoa." Get in your carriage and get out again; rattle the thills; make all the noise getting in and out you can; give him to understand, by snatching his foot each time he moves, that he must stand until you tell him to go; and after a few times you can put the whole family in the carriage, and he will not stir out of his tracks.

TAMING, Preparation for.—Take finely grated horse castor, and oils of rhodium and cummin; keep these in separate bottles, well corked; put some of the oil of cummin on your hand, and approach the horse on the windy side. He will then move toward you; then rub some of the cummin on his nose; give him a little of the castor on anything he likes, and get 8 or 10 drops of the oil of rhodium on the point of his tongue; you can then get him to do anything you please. Follow up your advantage by all the kindness and attention possible toward the animal, and your control is certain.

TENDONS, CONTRACTED.—First try the effect of lowering the heels a little more than the toe at each shoeing, and applying a shoe with a plate projecting an inch or two in front of the toe. If there is much tenderness of the back sinews on pressure, this form of shoeing must be avoided until that has been removed. The thickened tendons must be rubbed daily with a mixture in equal parts of strong iodine ointment and blue ointment, until blistering takes place, when it may be discontinued until the effects have passed off. The horse should have a yard or small paddock to run in where he is not very likely to be excited to vigorous or irregular action, or, if kept in-doors, let it be in a roomy box, and give a moderate amount of walking exercise daily. Should several months of this sort of treatment fail to restore in part, it may be advisable, perhaps, to have the back sinews cut through.

THRUSH.—This is a discharge of very offensive matter from the cleft of the frog. It is inflammation of the lower surface of the sensible frog, and during which pus is secreted together with, or instead of horn. In its treatment, almost any astringent substance will check thrush in its early stage. Tar and common salt mixed is a very good application, and tar and sulphate

of zinc can also be highly recommended. Before the introduction of either of these preparations, the frog should be carefully inspected and all decayed parts removed. The dressing must be pressed to the bottom of the cleft and commissures of the frog, and this should be repeated every other day or twice a week.

TRICKS OF HORSE-DEALERS.—Unless a man is accustomed to horses, it is the greatest folly in the world to depend upon his own knowledge in purchasing them, for there is a class of men who make their living by bringing up horses with all manner of defects, and which their art enables them to disguise just as long as is sufficient to take in their dupes. In buying as well as selling are these deceptions practiced. A few of these "tricks" are as follows. *To Make a True-pulling Horse Baulk.*—Take tincture of cantharides 1 oz., and corrosive sublimate 1 dr. Mix, and bathe his shoulders freely at night. *To Make a Horse Appear as if Lame.*—Take a single hair from the tail; put through the eye of a needle; lift the front leg, and press the skin between the outer and middle tendon or cord; shove the needle through; cut off the hair on each side, and let the foot down; the horse will go lame in 20 minutes. *To Make a Horse Stand by His Food and Not Eat It.*—Grease the front teeth and the roof of the mouth with common beef tallow, and he will not eat till you have washed it out. *To Make a Horse Appear as if Badly Foundered.*—Take a fine wire and fasten it tight around the fetlock, between the foot and heel, and smooth the hair over it. In 20 minutes the horse will show lameness. Do not leave it on over 9 hours. *To Cure a Horse of the Crib or Sucking Wind.*—Saw between the upper teeth to the gums. *To Cover Up the Heaves.*—Drench the horse with $\frac{1}{4}$ lb. of common bird shot, and he will not heave until they pass through him. *To Make a Horse Appear as if He Had the Glanders.*—Melt 4 oz. of fresh butter, and pour it into his ear. *To Nerve a Horse that is Lame.*—Make a small incision about half way from the knee to the joint on the outside of the leg, and at the back part of the shin bone you will find a small white tendon or cord; cut it off and close the external wound with a stitch, and he will walk off on the hardest pavement and not limp a particle. *To Disguise Lameness.*—When a horse goes dead lame in one shoulder, it can be disguised by creating a similar lameness in the corresponding leg, by taking off the shoe and inserting a bean between it and the foot. *To Put Black Spots on a White Horse.*—Take of powdered quick-lime $\frac{1}{2}$ a lb., and litharge 4 oz. Well beat and mix the litharge with the lime. The above is to be put into a vessel, and a sharp ley is to be poured over it. Boil and skim off the substance which rises on the surface. This is the coloring matter, which must be applied to such parts of the animal as you wish to have dyed black. *To Produce a Star on a Horse.*—Take a piece of coarse towlinen, the size of the wished-for star; spread on it warm pitch, and apply it to the shaved spot; leave it on for 2 or 3 days, when wash with a little asmart water, or elixir of vitriol, 2 or 3 times a day until well. When the hair grows it will be white. *To Make an Old Horse Appear Young.*—This is done by filing down the teeth, the dark markings on which are removed by a hot iron. Filling up the depressions over the

horse's eyes, by puncturing the skin over the cavity, and filling through a tube by air from the mouth, and then closing the aperture, when the brow will become smooth—for a time. The white hairs are painted out, when the animal will altogether have a youthful appearance.

URINE, Stoppage of.—Symptoms: Frequent attempts to urinate, looking round at his sides, lying down, rolling and stretching. To cure, take $\frac{1}{2}$ lb. of hops, 3 drs. oil of camphor; grind and mix. Make this into 3 pills. Give 1 every day, with a drench made of a small spoonful of saltpetre and 2 oz. of water. This will cure, as a general thing.

WARTS, To Cure.—The safest and most effectual caustic for destroying warts is chromic acid. Having first picked off the rough outer surface of the warts so as to make them bleed, apply, by means of a small wooden spatula, a little of the dry acid, rubbing it well in. This will cause a free discharge of watery fluid from the surface. In a few days the wart is converted into a tough, leather-like substance, which ultimately falls off, generally leaving a healthy sore, which soon heals.

WARTS ON A HORSE'S NOSE.—Dissolve $\frac{1}{2}$ lb. of alum in a quart of water. With a brush or cloth wet the warts twice each day for 4 days, and they will disappear. Another remedy is to smear the warts with salted butter.

WATER FARCIN.—Symptoms: The horse is dull and loses his appetite, and swells along the belly or chest and between the fore legs. To cure: Rowel in the breast, and along each side of the chest, as far as the swelling goes. Leave the rowels in until the swelling goes down. Give a spoonful of cleansing powders morning and night.

WEN, To Cure a.—Take equal parts of soft soap and slaked lime, well mixed. Lance the wen at the time of making the application, or two or three days after. Two or three applications will cure.

WIND-GALLS.—Wind-galls are puffy swellings above and behind the fetlocks, caused by the enlargement of the sheathes through which the tendons pass. In recent cases nothing further is required than rest, aperient medicine, and wet bandages wrapped firmly around the swellings. It may also be advisable to remove the shoe and shorten the toe to remove the tension of the tendons. When there is lameness, and the swelling is indurated, hot fomentations for several hours a day, or poultices, should be applied. A woollen bandage should afterwards be applied, and camphorated spirits well rubbed in daily.

WIND IN HORSES, To Improve.—It will be found, if tar water and powdered charcoal are mixed with the horse's feed, that it will have a most beneficial effect on his wind and condition.

WORMS IN HORSES.—1. Give every morning, one hour before feeding, 3 drs. of sulphate of iron and 2 drs. of assafetida; and every night, for a week, throw up an injection of 1 oz. oil of turpentine and 10 oz. of linseed oil. Green food is to be preferred.—2. White-ash bark burnt to ashes and made into rather a very strong ley; then mix $\frac{1}{2}$ a pt. of it with 1 pt. of warm water, and give all 2 or 3 times daily.

WOUNDS.—One of the best washes that is known for ordinary wounds on horses, is to take

$\frac{1}{2}$ lb. of saltpetre, $\frac{1}{2}$ a pt. turpentine, and put them into a bottle; shake up well before using; apply to the wound 3 times a day with a feather.

POULTRY.

BONES, To Pulverize for Fowls.—Put the bones in a stove and allow them to burn white, when they can then be easily pulverized; then mix with corn meal and feed twice a day.

CHICKENS, Management of.—After emerging from the shells the chickens should not be removed from under the hen. They are at first weakly and wet, but in a few hours they become thoroughly dry, and it is not until their little quaint heads peep from under the feathers of the hen that she should be removed from the nest. Many persons imagine that the chickens require feeding as soon as hatched. This is an error. At the time of hatching, the remains of the yolk are drawn into the digestive canal of the chick, and constitute its first food. This will last it for 20 to 30 hours, and then the chickens are strong and active on the legs, and ready to eat with avidity. As regards the first food for the chicks, there is nothing approaching in value to a mixture of equal parts of grated bread, yolk of hard-boiled eggs, and oatmeal slightly moistened with water. This is the best food for the first fortnight; then add gradually groats, hemp-seed, and green food, such as cress, lettuce, cabbage, and leeks, chopped fine. If the weather is cold and wet, add a little powdered pimento to the food occasionally, also a little finely minced meat as a substitute for worms and insects, fresh curd and hard-boiled eggs mashed up with the shells. Feed the chickens early in the morning, and often during the day, giving but little at a time; the water vessels should be shallow and frequently refilled, and so arranged that the chickens cannot get into them. Throw the food on the ground to the chickens; they will then pick up gravel along with it, which is necessary for the digestion of their food. Of course there is not so much necessity for a substitute for the natural animal food when the hens have a free range, and can scratch for worms and insects for the brood. It is important that a hen with chickens should be well fed, for if poorly fed she will drag her progeny about in search of food, taking them through the wet grass, and wearying them with over-exertion; but if well fed she broods them carefully, and only scratches to supply them with grubs and dainty animal food. Both hen and chickens must be carefully and warmly housed at night, and never allowed out until the dew is quite off the grass.

CAPONS.—Place the fowl on its left side on the table, with its back to the operator, a strap round its wings, and the legs in a noose. Pluck off the feathers between the first and second ribs, and with the thumb and finger of the left hand draw the skin tense, so as to ascertain positively the space between the ribs. With a very sharp knife make an incision through the skin only, an inch long, measuring from the point of the first rib backward. This will expose the two ribs and the margin of a large muscle running down the thigh. This muscle is in no danger of being injured if the incision be made at the proper point; but if otherwise, an injury to it will cause lameness. Divide the muscle between the ribs, by introducing the knife at the

point of the first rib and cutting backwards about an inch. In this way the pleura is surely avoided, and of course an escape of air.

Now, by introducing two small hooks, or any other suitable apparatus, draw apart the ribs so as to expose a bundle of fibres called the intercostal muscle. Should the incision be too small, it may be enlarged by passing the knife round the point of the second rib. Divide the belly of the intercostal muscle lengthwise, and you will perceive a semi-transparent membrane, called the peritoneum. This must likewise be divided, keeping the knife as far off as possible from the pleura. A branch of the coeliac artery traverses this membrane, and may be injured by a bungling hand or by inattention. On cutting through this membrane the upper testicle is brought into view. This lies on the margin of the lateral spinous processes, surrounded by nerves and blood vessels. It is a small yellow body, its color somewhat darkened by the membrane covering it. In pushing downward and forward the intestine, the second testicle is brought into view, lying centrally between two large blood vessels. This must be removed with great care, so as not to injure any of the neighboring veins.

CANKER IN FOWLS.—This disease is indicated by the mouth and throat becoming filled up with a cheesy substance of very offensive odor, which causes in some cases a stoppage of the windpipe and death by suffocation. It is to be treated successfully as follows: 1. If the fowl is not worth a good deal cut its head off.—2. If worth saving, with a small spoon and pincers take out all the cheesy matter, and wipe out all the slimy mucus from mouth, nostrils, and eyes.—3. Prepare a solution of chlorinated soda or chloride of lime. If chlorinated soda (Labarraque's solution) is used, dilute it with one or two parts of water. Wash the head, eyes, nostrils, mouth and throat out thoroughly, using a soft swab with one of these solutions, and in 20 minutes give the fowl a good feed of chopped meat, mixed with bread soaked in ale or spirits and water, and well sprinkled with Cayenne pepper. Give some solution of iron in the water, and keep up the diet indicated until well. Put the whole flock on a similar diet for a few days, especially those having colds.

CATARRH AND COLD.—These complaints in fowls are caused by their being exposed to dampness, and, if allowed to continue, will run to roup. Keep them on dry, elevated places. Red pepper mixed with soft food, fed several times a week, will remove a cold; and pulverized charcoal, given occasionally, is a preventive of putrid affections.

CHOLERA, CHICKEN.—A remedy promulgated by the Department of Agriculture is alum alone—giving 3 or 4 teaspoons of alum water daily, and mix with the feed (corn-meal) strong alum water. This is said to cure the very worst cases. Another remedy is to feed raw onions, chopped fine, mixed with other food, about twice a week.

CROUP.—Try and remove the croup membranes from the mouth with a feather, and then touch the parts with a feather dipped in a solution of nitrate of silver, 10 grs. to 1 oz. of rain-water. Feed no raw grain. Well boiled oatmeal or Indian corn-meal will make an excellent substitute. Put $\frac{1}{2}$ an oz. of carbonate of soda in every quart of the water drank by the chick-

ens, and, if possible, change their roosting place to a new building. If this last cannot be done, clean the place thoroughly, and wash it over with a solution at the rate of an ounce of carbolic acid to a quart of water.

CHICKEN-SCRATCHING.—Most people object to allowing hens in gardens because of their scratching peculiarities. This may be right at time of seed-planting, and until the young plants are well started on their growth above the ground; but before and after this time, when scratching will do no harm, chickens should be allowed their full freedom, because of the good they do in freeing the ground from insects. In a recent article which appeared in a prominent agricultural paper, the writer says: "Recently we were at work in our garden. Half of it was dug and some planted. The fourteen hens and two roosters were throwing dirt at a fearful rate; peas and beans were unearthed, but none of them were eaten; but when an earth-worm or grub was brought in sight, it was swallowed as suddenly as Western men are said to swallow oysters. While watching them, one found something that pleased her so much that she chuckled audibly. By making a sudden rush toward her, she dropped it—it was the pupa or chrysalis of one of those large green caterpillars (usually called "worms") that are found on potato and tomato plants. Gardeners who understand how to make their business profitable will use great quantities of well-rotted stable manure. If the hens are on hand when this manure is spread, how busy and how happy they will be! Some may suppose they are looking for grain; perhaps they do find some kernels, but more often chrysalids looking like grains of rye, which are the pupae of flies—generally our common house-flies. Could all such manure heaps be submitted to a thorough scratching by the poultry, we should be less tormented with insects. Both vegetable and fruit gardens could be arranged so that hens and chickens could have access nearly all the time to great advantage. Especially should fowls be kept in orchards. If so kept they will work among the trees, doing just what is needed, keeping the ground well cultivated, and destroying everything that can injure the fruit and trees in the shape of bugs, worms, and other insects.

DROOPING WINGS.—This, in either turkeys or chickens, is caused by vermin. To cure it, grease their heads, the under sides of their wings, and their bodies under their wings, with lard or fried meat fat, or any other grease. In a few days their wings will be natural, and their appetite and comfort will return.

DUCKS, To Fatten.—Give them oats, meal and barley. This feed puts on flesh rapidly. Shut your ducks up in a good coop, with no runway. They must have no exercise, for that gives health, not fat. Feed them with bran, oats, oat-meal, or barley-meal, cooked; put in a shallow vessel; give gravel, water, cabbage leaves or a sod of grass. Some feed Indian meal, and proceed with the cramming process; but this is unnecessary, as young ducks will eat all the food put before them, and in that way cram themselves without assistance. Let whatever food you give them be cooked and fed warm.

EGG-EATING HENS.—To cure this habit, break an egg and dust the contents nicely

with fine Cayenne pepper, afterwards turning the egg round so as to get the pepper below the yolk, if possible, and leave the egg in the offender's nest; or, if he catches her in the act of eating an egg, let him drive her away quietly, and place pepper in the remainder of the egg, endeavoring, as stated before, to get the pepper underneath. He will very soon see her running furiously about with distended beak. If one dose is not sufficient, administer another a little stronger. If fowls are well supplied with lime and gravel rubbish and animal food (fresh meat) in some form, hens will not eat their eggs. Artificial or china eggs should be used as nest eggs.

EGG-PRODUCERS, BEST.—Experience has indicated that for laying eggs the Polands are most desirable; for the table, Dorkings; and for early marketable chickens, Brahmas and Cochins. A writer who has had considerable experience in raising fowls for profit says: "The Farmer's Breed is the breed for profit. It consists of Brahma hens and colored Dorking cocks—the chicks from which are hardy, easily reared, grow fast, and in four months, without extra feed, will dress four to five pounds each of fine-grained, well-formed, plump-breasted, well-colored flesh, fit for the table of any amateur or epicure, and always commanding a good price in market. The hens from this cross are even better and more continuous layers than either pure Brahma or the Dorking; but if wanted to breed again, the farmer must keep one coop separate of Brahmas—say a cock and two hens—and so also of the Dorkings, and thus yearly with the cross of pure bred birds, cocks of the Dorkings and hens of the Brahmas, keep up the "Farmer's Breed for profit."

EGGS, SEX OF.—It is affirmed with assurance that the eggs containing the germ of males have wrinkles on their smaller ends, while female eggs are smooth at their extremities.

FATTENING POULTRY.—The fowls designed for being fattened should be well and liberally fed from the time they are hatched. It is a mistake to suppose that they can be kept low when young, and got up to a great size by liberal feeding when put up to fatten. The fowls so treated are stunted in their growth, the bony frame-work becomes set, and they never afterward attain a large size; whereas with liberal feeding they become fit for the fatting-coop at the age of about four months in summer, and from five to six in winter. It cannot be too strongly impressed upon those who are desirous of obtaining poultry of first-rate quality, that fowls are only in perfection for the table before they have attained their complete development. The cockerels should be put up when "their tails begin to turn"—namely, just when the two long sickle feathers or streamers begin to top the straight feathers of the tail; and the pullets before they have laid. They may be either confined within a small space or placed in a coop, in a warm and rather dark situation, and, of course, under cover. The fowls should be separated from each other by partitions in the coop, and no more space ought to be allowed them than is necessary to make them comfortable, without allowing room for exercise.

The fatting-coops should stand on legs, in order to raise them to a convenient height from the ground, so that the dung may be removed

daily; or each may have a shallow drawer underneath, being daily filled with fresh earth—an admirable plan—the fowls being very fond of nestling in dry earth, and earth being a deodorizer and disinfectant, it is most conducive to their health. The most scrupulous cleanliness must be observed in the case of fattening fowls; the troughs in front of the coop must be removed when the fowls have ceased eating, the remains of food taken out, and the troughs scalded and laid in the sun to dry daily. Not a particle of food that has become sour should be given to them; indeed, they will eat better if fresh food, and of a different kind, be given to them at each meal. When first put into the coop they should not have any thing placed before them for some hours, till they have recovered from their fright at being caught, and have become accustomed to their new residence. Afterwards they should be fed with much regularity three times each day, giving them at each meal as much as they can eat, but not leaving anything for them to pick up in the intervals.

When first placed in the coop they may be fed twice a day on boiled potatoes, mashed up with coarse oat-meal, and moistened with a little new milk. The third meal may be Patna rice, well boiled, with a little milk added. When the fowls are nearly fat, the rice may be given twice a day and the potatoes only once; the rice makes the flesh white and clear. A little vegetable, chopped fine, may occasionally be given to vary the character of their food; the earth in the coop will supply the small stones necessary for their digestion. The first meal should be given early in the morning, the second about mid-day, and the last at dusk, when the other fowls are going to roost.

On this system of feeding, a fowl will become perfectly fatted in from a fortnight to three or four weeks at the outside. When fat it should be immediately killed; for not only is it unprofitable to keep it any longer, but it deteriorates very rapidly, losing weight and becoming hard and coarse in the flesh. Before being killed, the fowls should be kept for fifteen or sixteen hours without food or water. If this precaution is not taken, (and it is unfortunately often neglected,) the food in the crop and intestines ferments. When this is the case in summer, the fowl in a few hours turns green, and is entirely unfit for the table.

FOWLS, OLD.—To have the poultry yard profitable, the fowls should not be kept until they are old. There is no objection to preserving a favorite cock, as long as he is active and lively, but hens after three years will not produce as many eggs as those of one or two years.

GAPES.—This destructive disease is believed to be infectious and epidemic. Unless perhaps thus communicated by others, it never occurs except there has been foul water, exposure to wet, and want of nourishing food. The disease consists—at least so far as actual symptoms extend—in a number of small worms which infest the windpipe, and cause the poor chicken to gasp for breath. If taken early, it will be sufficient to give, every day, a morsel of camphor the size of a grain of wheat, and to put camphor in the drinking water; or a little turpentine may be given daily in meal, taking care, of course, that the deficiencies in diet and shelter be also

amended. In fully developed cases, the worms must be removed by introducing a loop of horse-hair into the trachea, and turning round during withdrawal—the operation to be repeated several times, till all the worms appear to be extracted. A feather, stripped almost up to the top, may be used instead of the horse-hair. Crumbs of dough impregnated with soft soap, given once or twice, is also said to cure.

GEESE, TO MANAGE.—The goose lays from 10 to 20 eggs before sitting, and when she is well fed and attended to she will lay and hatch 3 times in a year. She begins to lay early in March, and even toward the end of February. The period of laying may be perceived in the circumstance that the goose at that time carries about straws in its bill, prompted by the development of the maternal instinct to prepare a nest. When this practice is observed it will be found prudent to confine the bird, providing her with a nest for laying and hatching in, which should be made of straw lined with hay, and so formed that the eggs will not readily fall out, especially when the bird turns them. 15 eggs will be sufficient to place under even a large bird. The period of incubation is a month, but some of the goslings may be hatched a day or two before this time; it is desirable, however, that all the young birds be hatched about the same time, and to this end as much care as is practicable should be taken to have all the eggs equally fresh. When the brood are hatched they ought to be turned out into a sunny place, sheltered alike from cold winds and bad weather; but it is not only unnecessary, but prejudicial, to feed them for 12 hours or so. Their earliest food ought to be bread soaked in milk, curds, porridge, boiled greens, boiled potatoes mixed with bran; and such food ought to be given them at a moderate temperature, so as to avoid the entrance of heat or cold, and for a couple of days at least after being hatched the goslings ought not to be allowed access to cold water, which often gives them cramp.

As a general rule, geese ought to be confined as little as possible. If they are allowed to run about the fields, ditches, and streams of water, they will forage for themselves very successfully. Grass and water are essential to their comfort and well-being, such grass especially as may be found on damp and swampy soil, and which, however rank or coarse it may be, is well adapted to them. In harvest time the stubble-fields are an excellent pasturage for them; they can there pick up no small supply of corn, and which would otherwise be lost, and they obtain abundance of young grass and other herbage. The advantages of a stubble-field, however, are not always to be had, but where this occurs the kitchen-garden may be made available. In autumn the geese may be turned into it without the danger of their doing any serious damage; but they ought to be fed occasionally on boiled potatoes, bruised up with bran, or the result of their foraging for themselves will not be productive of any advantage.

Goslings in June and July will fatten without any food beyond what they can gather for themselves in the stubble-fields; but if it be necessary to hasten the process they must be supplied with additional nutriment for that purpose, such as potatoes and turnips bruised with meal, and they should thus be fed once a day. There are

various methods of fattening geese, but the simplest and best is nutritive food, and in abundance.

GUINEA FOWL.—This bird is a native of that part of Africa which its name indicates, but it is also said to be indigenous in America. It is a larger bird than our ordinary barn-door fowl—but the eggs are small, three of them being hardly equal to an ordinary hen's egg; they are, however, numerous and well-flavored. This fowl does not thrive in confinement, but requires perfect liberty, and a wide space over which to wander. And it is of so pugnacious a character, moreover, that it can hardly be got to associate with other poultry on amicable terms. The difficulty of rearing the young ones in this damp climate, and the very noisy and destructive habits of the old birds, may account for their absence generally from our poultry yards. They are, however, very excellent eating, and well worth the trouble of keeping. The best way to raise and keep them is to procure some eggs of a good stock, hatch them under a small variety of fowl, such as game-fowl or bantams; when the chicks appear, keep them under cover where they can have plenty of air and dry gravel; feed them frequently—at least once in every three hours. Begin by giving eggs and milk made into rather a dry custard; toward the end of the first month add a little oat-meal mixed with milk, and as they grow older boiled vegetables small wheat and potatoes may be given. Ants' eggs are their favorite delicacy, and will be found most nourishing food for them. These birds are very fond of scratching in a garden, not for seeds, but for insects and grubs, and it is questionable whether they do most harm in rooting out the gardener's seeds, or good in destroying the insects that would destroy his plants after they had grown up.

HENS, To Make Lay.—A hen is said to have the capacity of laying 600 eggs and no more—a few in her first year, from 320 to 375 in the next three, and the rest from the fifth to the ninth inclusive. The true economy, therefore, is not to keep hens after their fourth year. By feeding stimulating food, the hen can be made to lay the quantum of eggs with which she is endowed in a much shorter time than if left to scratch for herself. There is no better food for this purpose, fed each alternate day than the following: To 3 gals. of boiling water add $\frac{1}{4}$ oz. of common salt, a teaspoonful of Cayenne pepper, and 4 oz. lard. Stir the mixture until the pepper has imparted considerable of its strength to the water. Meantime the salt will have been dissolved and the lard melted. Then, while yet boiling hot, stir in a meal made of oats and corn, ground together in equal proportions, until a stiff mush is formed. Set away to cool down to a milk warmth. Before feeding taste to see that you have an overdose neither of salt nor pepper, and to prevent the hens from being imposed upon with a mixture not fit to be eaten. Besides this, especially during the winter, give them on the days on which the above mixture is omitted, a $\frac{1}{2}$ oz. of fresh meat chopped fine, and at all times plenty of pure water, grain, gravel, and lime.

HEN-ROOSTS, To Destroy Vermin on.—This can be done promptly and simply by sprinkling kerosene on their roosts.

HENS, To Set.—The most convenient way to

set hens is to get a common tea chest or box, put a portable sloping roof to it, made of a few pieces of board. Put a hole at one end, like that for a dog-kennel. In front of this put a wire pen or frame made of lath. Provide the hen with food and water daily, and you need not be under anxiety about your hen leaving her eggs; she cannot get out, and will return on the eggs, if really broody, in a very short time. In this way you would have them entirely under your command.

HENS, To Prevent Setting.—Setting hens can be cured by putting water in a vessel to the depth of one inch, putting the hen into it, and covering the top of the vessel for about twenty-four hours. The vessel should be deep enough to allow the fowl to stand up.

KILLING AND DRESSING POULTRY.—As much, if not more, depends on the manner of killing poultry as in the dressing to have it look fit for market. Too much caution cannot be used in this branch of the business. One mode of killing fowls, (instead of wringing the necks, which we deprecate,) is to cut their heads off with a single blow of a sharp ax, hang them up by the legs and allow them to bleed freely, and pluck their feathers immediately—while yet warm. The French mode, which is highly commended—we think far the best, as it causes instant death, without pain or disfigurement, and is simply done by opening the beak of the fowl, and with a sharp-pointed and narrow-bladed knife, make an incision at the back of the roof, which will divide the vertebrae, and cause immediate death, after which hang the fowl up by the legs till the bleeding ceases, and pick it while warm, if you desire the feathers to be removed. With a little care the skin of the fowl does not become as torn and ragged as it does in the old-fashioned way of scalding. Another thing, the flesh presents a better and more natural appearance when not scalded.

Geyelin says: "Some breeders cram their poultry before killing, to make them appear as if heavy; this is a most injudicious plan, as the undigested food soon enters into fermentation, and putrefaction takes place, as is evidenced by the quantity of greenish, putrid-looking fowls that are seen in the markets." Fowls should always be allowed to remain in their coops at least twenty-four hours previous to being killed without food; by so doing the breeder will be a gainer in the end; as his poultry will keep longer, and present a better appearance in the market; and above all he will show the purchaser that he is honest, and has not crammed his poultry for the purpose of benefiting himself and swindling others.

LAYING SOFT-SHELLED EGGS.—This results from a deficient supply of lime, and an excess of soft and animal food. Give with the feed more plaster, pounded oyster shells, gravel and rubbish, etc.

LICE—and other vermin—on fowl may be treated by making their roosts perfectly clean with hot water and soap-suds, and applying afterwards spirits of turpentine (to the roosts.) The whole of the building which they occupy should be kept scrupulously clean. Another method is to strew small branches or sprays of cedar about the henery. This, also, will be found very effective.

POULTRY FOR MARKET.—When fowls

are killed before being sent to market, it is best not to pack them as soon as they are plucked. It is best to let poultry hang at least 24 hours after being picked before packing, so as to allow the animal heat to entirely pass off. After picking, wash off the blood-stains with a cloth and warm water in a careful manner, for if any are left to harden and become dry, their removal will prove very troublesome.

ROUP.—Symptoms: The symptoms of roup are at first identical with those of a severe catarrh; the discharge from the nostrils, however, soon loses its transparent character, becoming more or less opaque, and of a very peculiar and offensive odor; froth appears in the inner corner of the eyes, and the lids swell; in severe cases the eyeball is entirely concealed; the nostrils are closed by the discharge drying around them, and the eyelids are agglutinated together; the diseased secretion accumulates within to a great extent, consequently the sides of the face swell to an extreme degree, and the bird, unable to see, or feed itself, suffers from great depression and sinks rapidly. With respect to the communication of this disease, my experiments prove that it is exceedingly contagious. It is frequently communicated by fowls drinking out of the same vessel, as the discharge from the nostrils of the sick bird contaminates the water as it drinks. No common fowl is worth bothering with after the eyes swell badly; before that they may be cured with tolerable ease. The mouth, throat, eyes and nostrils should be washed out clean, and sponged with strong chloride of lime water, or, what is better, Labarague's solution, chlorinated soda, and the whole flock, but the ailing ones particularly, should have the heartiest diet—iron in their water, bread and ale, soft feed well peppered, and meat of some kind.

TURKEYS, TO REAR.—First, a quiet hen is to be sought for as a sitter, and when such an one is obtained, the next care is to give her a quiet and rather secluded place for her nest while sitting, which is of more importance than some think, who do not give themselves the trouble to care for such small matters. Bronze turkeys are large birds, and will cover 15 to 18 eggs with ease; while sitting they should not be disturbed, and should not be taken from the nest after hatching for at least 24 hours, or longer, if she sits contented, as the young chicks gain strength very fast by being kept quiet for a day or two at first. If the hen is quite gentle, (as she should be, if possible,) it is best to watch the hatching process, and if a chick is not likely to come out strong, the shell may sometimes be broken, and the chick saved; in taking the hen with her brood from the nest, she should have a large, airy coop, where the grass is closely mown off, where the chicks can bask in the sun at pleasure, and have quite a run for exercise, and the picking up of bugs and insects.

The feed should be mostly curds, made from sour milk heated, and the whey drained off and seasoned with pepper. After a few days, according to their strength and the quietness of the hen turkey, they should have the range of the farm. At first a small portion of the day, after the dew is all off, they should be housed at night, and not let out till the wet is off the grass in the morning; then by liberal feeding whenever they come near their roosting quarters, they will be healthy and grow very fast—especially if

grasshoppers are plenty, as they are some years in most sections of the country. When it is the time for the fattening seasons, they should then have all the good food they will eat, of a variety such as corn, buckwheat, boiled potatoes, chopped cabbage, etc., and if kept where they can get what they will eat when they want it, they will fatten very fast.

An experienced farmer gives his experience as follows: Let the mother of the new-born brood choose her own time to leave the nest. Taking off is always bad policy. As soon as the nest is left, make a yard, twelve feet square, by setting boards edgewise. Remove the turkey and her brood into this little pen, wherein they should be kept for at least six days—after which they may be let out in the middle of the day, and permitted the range of an acre; but they must always be gathered at least an hour before sundown into the pens to remain until the dew is off the next morning, and all the day, if there is the least appearance of a storm. The time the mother leaves the nest, wash the naked parts of her body thoroughly with tobacco juice, to kill the inevitable lice; and at the same time dust thoroughly the young with some vermin-destroying powder. No one thing kills as many young turkeys as these parasites. As a preventive, sulphur and snuff, mixed in equal quantities, and dusted on the nest after the turkey has been sitting two weeks, is recommended; but nothing should prevent the washing of the mother, or the dusting of the young, the day the mother leaves the nest, and 2 days after the young have left the shell. Young turkeys require but little food, but they need to be fed as often as once an hour for the first week. Coarse-ground Indian meal, mixed with sour milk curds, and finely chopped hard-boiled eggs, is the best feed for the first month. After that, the eggs may be left out, the meal ground a little coarser, and the curds, if you have them, used in larger measure than at the first. As soon as they can swallow whole grain, give them that, and then all trouble in this direction is at an end. Until they are two months old, they must be driven to some shelter every night, and never be allowed to remain in the fields through a long or heavy rain. Even when one-quarter grown, they will die from exhaustion, trying to follow the vigorous and unreasoning mother, if wet with but a very heavy dew. Three rules, then, must be observed, if those who attempt to raise turkeys would secure success: First—Be sure to free both old and young from lice immediately upon the old ones leaving the nest. Second—Feed frequently at the beginning with strengthening food. Third—Never let the young turkeys get wet, either with dew or rain, until their feathers afford their bodies, if not complete, at least partial protection.

TURKEYS, Charcoal for.—A recent experiment has been tried in feeding charcoal for fattening turkeys. Two lots of four each were treated alike, except for one lot finely pulverized coal was mixed with mashed potatoes and meal, on which they were fed, and broken pieces of coal also plentifully supplied. The difference in weight was one and a half pounds each in favor of the fowls supplied with coal, and the flesh was superior in tenderness and flavor. This suggestion is well worth a fair trial from those engaged in turkey-raising.

FARM, ORCHARD, GARDEN AND DAIRY.

ACCOUNTS, KEEPING.—Keeping of accounts is almost an absolute necessity to a farmer's success. If we should be asked what is the great hindrance to the advancement of ordinary farmers, we should reply, the want of some systematic plan in their labors, especially the want of some systematic mode of keeping their farm accounts. If we ask them the cost of raising 100 bushels of corn, or making 100 lbs. of pork, not one in a thousand can give an answer based on actual figures. They *guess* a bushel of corn costs so much, but their guessing is often wide of the truth. The great majority of farmers cannot tell the net income of their farms, and hardly know whether they are progressing, standing still, or retrograding. If a merchant or a manufacturer should conduct his business in this shiftless way, we should expect him to fail, and the reason that farmers do not more frequently fail is that their business is comparatively limited. They live mainly within themselves. The farm supports the family, and the family take care of the farm. They would find their interest in farming as well as their skill and profits greatly to increase if they would adopt some mode of ascertaining how much this and that crop costs, and cultivate such crops and rear such animals as are found by actual calculation to pay the best. How are we to decide what branches of farming are the most profitable unless the figures of the farm account show us? Shall we guess whether it is better to make butter or cheese, or sell our milk, or shall we know definitely about these points? The question is sometimes mooted whether Eastern farmers had better raise their own corn or buy it of their Illinois neighbors. How can this question be decided, unless we know how much it costs to raise a bushel of corn?

Whoever makes accurate experiments and keeps accurate accounts not only benefits himself but the public. We know there are many circumstances to be considered in estimating the cost of raising crops and feeding stock; and with the greatest accuracy of observation, the results of farm experiments are often only approximations to the truth, but whoever labors even for these approximations is a public benefactor. The general principles of practical agriculture can never be established till we have more of these accurate experiments on which to base them.

Many seem to suppose that it is a great burden to write down in the evening the results of the day. They can handle a crowbar or a plow for ten hours, but ten minutes' work with a pen is an Herculean labor. This is a mere imaginary lion in the way of keeping accounts. It only wants resolution to undertake the work, and a little practice will make it easy. Possibly the task may be devolved on some young member of the family, whose fingers are not unused to the pen or stiffened by hard work. A general farm account should be kept, in which the farm is charged with all its expenses and credited with all its receipts. Besides this general farm ac-

count, a more minute record should be kept of each crop, charging with all the labor, manure, seed, etc., bestowed upon it, and crediting it with all the returns, whether sold or used in the family. Such a book will prove a treasure of wisdom to every farmer who keeps it.

APPLE-TREE BORER.—To remove and destroy this pest of the orchard, in the spring, just before vegetation starts, level the ground, and pack it firmly around the root of the tree, in a circle of about two feet in diameter, according to the size of the tree. Take unleached ashes and air-slaked lime in equal parts, well mixed, and apply to the circle thus made, covering the ground all over two or three inches in depth. Then take strong soap suds, or, what is better, a solution of half a pound of sal soda to one gallon of water, and wash the entire trunk and the base of the limbs thoroughly. Repeat this operation in the fall of the year, just before freezing weather, covering the ground with the mixture of ashes and lime, and washing the trunk and base of the branches with the solution of sal soda. If the borers have already made an entrance into the tree, the only way to get rid of them is to dig them out by the use of a fine, annealed wire, avoiding as much as possible the cutting away of the bark in the necessary preparation for entering the holes.

APPLE TREES, To Keep Rabbits from Barking.—1. Take any quantity of sweet milk you may desire, and add to it soot from the stove pipe or chimney, where wood has been used, until it is a thin paint. Take a warm, dry day to wash your trees, so it will get dry before a rain. One thorough washing will generally be found to be sufficient.—2. Thoroughly rub the trunks with the dead body of a rabbit.

APPLES, To Color While Growing.—A bright red color can be imparted to growing apples by the application of the oxyd of iron to the soil about the roots of the trees. Anvil dust and cinders, etc., will answer the purpose.

APPLE TREES, Treatment of.—In the autumn, as soon as the leaves have fallen, every tree should be carefully and freely pruned; this will open a passage to the sun and air, and will contribute to health in the future season. In addition to this, brush off the moss and cut off the cankered parts, and unless the orchard is plowed, the soil should be opened at the roots.

APPLE TREES, (Old,) To Renovate.—Take fresh-made lime from the kiln, slake it well with water and well dress the tree with a brush, and the insects and moss will be completely destroyed, the outer rind will fall off, and a new, smooth, clear, healthy one will be formed, and the tree will assume a most healthy appearance and produce the finest fruit.

APPLE TREES, Lice on.—The apple-bark louse is most common on unhealthy trees—trees that are grown in grass and are most likely to be infected with them. It is hurtful to trees and should be exterminated. A good way to do this is first to feed the trees liberally with manure and ashes. Ashes alone, if you have no

manure to spare, placed about the roots—not in contact with the body—will help. Dig up the grass about the tree. In the spring take a hoe and give the bark a good scraping; then wash the tree with strong soap-suds. This should be done early and the washing repeated once or twice before the trees blossom.

APPLE-TREE SUCKERS.—Many otherwise good orchards are allowed to become defaced, as well as seriously injured, by allowing a profusion of suckers to grow at the base of the trunks. Attempts are sometimes made to get rid of them by cutting them off down to the surface of the ground, and leaving considerable portions below in the form of short stumps. These sprout again, and they soon become quite as bad as ever. A better way is to wait until they are in leaf, at which time they are loosened more readily, and taking each separately in the hands, place a thick boot upon it near the tree, and they are quickly separated. If done at that time they will not be likely to sprout again.

APPLE TREES, To Plant.—The trees, in all cases, should be set without bending or diverting them from their natural direction, and the more room is all the better. The subsoil or dead earth should be removed from the bottom at least a foot deep in shallow soils, and its place supplied with good surface soil or compost. A compost of well rotted manure and meadow mud is admirable for this purpose, and for filling the hole when the tree is set. Care should be taken not to set too deep. The roots need the influence of the atmosphere, of light and heat, as well as of manures and rains, and languish if buried below this influence. It is a safe rule to set no deeper than the trees stood in the nursery, and this can easily be determined by their appearance at the base. Every fibre should be extended in its proper direction, level and not dipping, and carefully surrounded with compost. No vacant places or cavities should be left in covering the roots, nor injury done to them by the hand or spade. A tree should not be taken from a soil much richer than that to which it is transferred.

ARTICHOKE, JERUSALEM.—Boussingault says, in his "Rural Economy:" There are few plants more hardy and so little nice about soil as the Jerusalem artichoke; it succeeds everywhere, with the single condition that the soil be not wet. The tubers are planted exactly as potatoes, and nearly at the same time; but this is a process that is performed but rarely, inasmuch as the cultivation of the helianthus is incessant, being carried on for years in the same place, and after harvest, in spite of every disposition to take up all the tubers, enough constantly escape detection to stock the land for the following year, so that the surface appears literally covered with the young plants on the return of spring, and it is necessary to thin them by hoeing. The impossibility of taking away the whole of the tubers, and their power of resisting the hardest frosts of winter, is an obstacle almost insurmountable to the introduction of this plant, as one element of a regular rotation. Experience more and more confirms the propriety of setting aside a patch of land for the growth of this productive and very valuable root. Of all the various plants that engage the husbandman, the Jerusalem artichoke is that which produces the most at the least expense of manure and manual

labor. He then directs the reader's attention to an example where the artichoke had been produced for thirty-three successive years with success, while they had received no care or manure for a long time. Those who wish to try it must plant it as early as the condition of the soil will allow. The land after plowing is marked out with furrows 3 feet apart, and the small tubers are dropped about 18 inches apart, and covered 3 inches deep. Go over the field in a week or two with a light harrow to kill weeds, and cultivate between the rows until the plants get large enough to render it unnecessary. It grows very readily in dry soil. Those who make trial of it should take care that the plant does not become established as a weed.

ASPARAGUS, To Cultivate.—To raise the asparagus plant, first select a piece of ground which is light, but not too much so; have it harrowed finely and plowed deeply; then draw furrows through it far enough apart to admit of a hoe-harrow or cultivator; then spread stable manure in the rows, or better still apply the manure broad-cast and plow it in; then draw the furrows afore-mentioned, taking care to draw them very shallow; then take the seed and sow it very thinly in the rows; after you have finished sowing, cover lightly with a wooden rake. When the plants begin to show themselves be sure to keep them free from weeds and grass, as much depends on the healthiness and size of the plants. I will give two methods of planting when they are planted for their final culture. Select a dry, light piece of ground, well exposed to the sun, as by such a course it will sprout earlier, and thus augment considerably the profits. Have it manured heavily with good barnyard or stable manure; then have the ground plowed, following immediately with the sub-soiler, and make it as fine as possible; then draw furrows three feet apart, and six or eight inches deep, the entire length of the bed. March or April, according to the season, is the time to set out asparagus plants. They should be only one year from the seed, as this is sufficient if properly cared for and kept clean while growing. After having prepared the ground as above-mentioned, take the plants from the seed bed, being careful to expose them as little as possible. Then take the plants to the ground allotted to them; place the plants, or more properly called roots, eight or ten inches apart in the row, spreading the roots as much as possible, taking care to have the crown of the plant only about two inches below the surface; when they are all placed in the right position, draw the ground over the crowns with the back of a wooden rake to the required depth. Permit the crop the first two years to run up to stalks, keeping the ground as free from weeds as possible. The third year from planting is the time to gather the first crop for market. Begin to cut as soon as the shoots are fit, and continue cutting until the first of June or thereabouts, and then leave the rest to encourage the formation of new roots. The shoots are tied up in bundles of 25 to 30 stalks, and when marketed early and in good condition bring remunerative prices.

The other mode of planting is to dig trenches about two feet deep, and three feet apart, the length of the field, taking care to keep the subsoil from the good manure, and throw about six inches of it in the trench, ground; then mix the

ground with considerable sub-soil, and then set the plants. The following spring the trenches are filled up, and every subsequent spring a heavy coat of manure is plowed into the asparagus bed. Care should be taken in cutting the shoots not to cut deep enough to injure the roots, as the future productiveness of the plantation depends partly in observing the above.

ANNOTTO, Choice of.—Annotto should be chosen of a good flame color, brighter in the middle than on the outside. It should feel soft and smooth, and have a good consistence. It should possess a strong smell.

ANTS IN GREENHOUSES, To Destroy.—Place some arsenic, mixed with sugar and water, in a saucer, which cover with a slate, leaving room for the insects to pass between the slate and the saucer. A stone ought to be set on the slate to prevent any other creature but the ants from getting access to the poison. Lime water, poured into the nests, will also destroy them.

BANKS, (Steep,) To Cover with GRASS.—For each square rod to be planted, take half a pound of lawn grass seed, and mix it intimately and thoroughly with about six cubic feet of good dry garden earth and loam. This is placed in a tub, and to it liquid manure, diluted with about two-thirds of water, is added, and well stirred in, so as to bring the whole to the consistency of mortar. The slope is to be cleaned off and then made perfectly smooth, and then well watered, after which the paste just mentioned is to be applied with a trowel, and made as even and as thin as possible. Should it crack by exposure to the air, it is to be again watered and smoothed up, day by day, until the grass makes its appearance, which will be in eight to fourteen days, and the whole declivity will soon be covered by a close carpet of green.

BARLEY, To Cultivate.—Our climate is not as favorable for barley as for oats and wheat. We cannot obtain a good crop unless the soil is dry, clean and rich. It seldom does well on a recently inverted sod. Its best place in the rotation is after a highly manured and thoroughly cultivated corn crop. The best crops are obtained on a rather heavy calcareous loam, provided it has been thoroughly pulverized during the preceding summer and autumn. But as this is seldom the case, the soils that usually give the best medium crops are those of a lighter and warmer character—or sandy loams.

Barley should either be sown very early, or rather late—say the moment the ground is fit to work in the spring, or not until after the heavy spring rains are over. Much depends on the season. If there has been heavy rains soon after the barley is sown, and then before the plants cover the ground, dry weather sets in, the surface of the soil becomes baked, and the crop suffers. An early sown crop would suffer less, because it would have got a good start before the drouth set in. A crop sown immediately after the spring rains, as soon as the land is in condition to work, commences to grow rapidly at the very first, and often does better than a crop that is sown two weeks earlier—but not as well as a crop sown a month earlier. If the soil is rich and has been plowed the fall previous, sow as early as it will work without clogging.

When barley is grown to sell, the six-rowed, or what is usually called the four-rowed (though

there is no such thing as a four-rowed barley,) is the most profitable—because it brings from ten to fifteen cents a bushel more than the two-rowed. But when barley is grown to feed out on the farm, the two-rowed is altogether the best—especially on strong, rich land. It weighs a great deal more per bushel, and if the soil is rich enough, it will yield more per acre. It has another advantage—that of being later than the four-rowed, which ripens at the same time as wheat, and we have wheat and barley harvest on us at once. With the two-rowed, we can get through with the wheat by the time the barley is ready.

It is usual to sow from 2 to 2½ bushels per acre. If the land is very rich and it is sown early and drilled in, less seed is required. The yield varies more than that of almost any other crop, depending somewhat on the season, but much more on the condition and previous culture of the soil.

BARLEY, To Harvest.—When the straw is long enough, the best way to harvest barley is to bind it up the same as wheat. It requires to be cut just at the right time. If cut too early, the grain shrivels up, and if it is allowed to stand a few days too long, it “crinkles down,” and the heads drop off in reaping and are lost. We know of no better test than to squeeze the grain between the thumb and finger, and if there is the least appearance of milk, the crop should be allowed to stand longer. The real difficulty, however, is in the uneven ripeness of the crop. Some portions will be dead ripe, while others are still green, and it requires considerable experience and a sound judgment to decide whether we shall lose most by cutting before it is all ripe, or by letting a portion of it get so ripe that there is danger of the heads falling off. Much depends on the weather. In this as in many other farming operations we must calculate our chances—and not be discouraged if we sometimes miss the mark. When barley is clean and the weather favorable, there is perhaps no better—certainly no cheaper—way of curing it, than to allow it to remain in the gavels as thrown from the platform of the reaper. They may be turned or stirred to facilitate the drying, but otherwise may remain as left by the reaper until ready to draw in. By moving one or two swaths to make room for the team, two men with barley forks can pick up the gavels of three or four swaths on each side of the wagon, and place them on the load. In this way scarcely any of the barley will be scattered on the land.

But if there are weeds or grass in the barley, or the weather is threatening, it will be necessary to turn the gavels, and towards night put them into small cocks, which will have to be turned or opened the next day and recocked in the evening again, if not sufficiently cured to draw in. It should be borne in mind that barley is very frequently stained in the stack or the mow, from being drawn in too soon, or with the dew on it. Barley should be either thrashed as drawn from the field, or not until it has done “sweating” in the stack or mow. If the former, it will be necessary to watch the grain in the bin and turn it occasionally, or it will heat and become discolored. The rakings should be kept separate, as the grain is frequently stained, and if mixed with the rest may reduce the price of the whole several cents per bushel.

BEANS, To Cultivate.—These grow best in warm, rich, mellow soil. The bush beans are planted in drills, about two inches deep, and two inches apart in the row. The drills may be from one foot to eighteen inches apart. When the plants are three or four inches high, the earth should be drawn up to the stems, and just before they begin to blossom they should be again earthed up with loose, mellow soil. They require to be frequently hoed while growing, that the ground may be kept loose and free from all weeds.

Pole or running beans are planted in hills, two by three feet apart, five or six beans to the hill, and covered about a couple of inches deep. It is of no use to plant until the soil has become warm. These beans need the support of a pole or rod, thrust deep enough into the ground to sustain the weight of the vines, usually about eighteen inches, and standing eight or nine feet high. Three healthy plants will be enough to grow in each hill.

BEANS, LIMA.—The principal point in the successful culture of the Lima bean is to get the seed well started. The best way of doing this is to plant in a hill of light earth, made so by sifting the soil, if it can be had in no other way. A shovelful of well-rotted manure should go into each hill. Then mix sand and muck, and after placing each seed bean with the germ downward in the hill, sift the covering over it through a willow sieve. Corn-planting time is the right time to plant Lima beans. The after-cultivation is the same as for the common pole bean.

BEAN, CASTOR-OIL.—The best land for the growth of the castor-oil bean is a light sandy loam soil, with a substratum of clay. First, break up the ground well as for corn, and then lay off the rows six feet apart. Between every seventh row leave an interval of six feet, to admit the passage of a horse and slide when the beans are being gathered, as hereafter explained. Before planting, put the seed in very warm (not boiling) water, and let them soak all night. Drop six or seven seed in each hill, the hills six feet apart each way. Thin out to two plants after the plants have got too large for the cutworm, which is sometimes quite destructive. At this stage, if the plants are vigorous and healthy, reduce to one plant, leaving two only where the plants look delicate. Keep the crop clean, first with the plow, then with the cultivator, and now and then drawing a little dirt around with the hoe. When the plants are some two feet high no more work need be done, unless, after a long spell of rain, you may loosen the earth with your cultivator. After the ripening of the beans, which will be in July or August, take your horse, and slide along the rows left for that purpose, and with a pair of shears clip off the pod-bearing spikes as soon as the pods begin to turn of a brown or chocolate color. They must be promptly cut at this stage, or the beans will pop from the pod and be lost.

Have ready a shed with a plank floor, or a piece of ground, well cleaned, beaten and rolled, like an old-time threshing floor, twenty or thirty feet square, well exposed to the sun, on which throw your spikes, and turn them over occasionally until all the beans drop out. Then scrape away the husks, gather the beans, and go into the field for a new supply, as they will continue to bear and mature until frost. Do not al-

low the beans, when drying, to get wet. Hence an open shed is best. If you have no shed, when the weather is threatening, rake into a heap, and cover with a tarpaulin or boards. They should be well fanned and winnowed of chaff before being sacked for market. From 15 to 25 bushels per acre is the average yield.

BEECHNUTS, Uses of.—Beechnut oil is most valuable for culinary and lighting purposes. The oil is obtained from the beechnuts by the same means as from castor beans and from cotton seed, the crushed material being subjected to the action of heavy presses. The nuts yield 16 per cent. of their weight of oil, or about a gallon of oil to the bushel. In England, as long ago as the time of Queen Anne, a company was formed to carry on the manufacture of beechnut oil, and afterward, in the reign of George I., an application was made for a patent for making butter from beechnuts. In France, and in some parts of Germany, the inhabitants use beechnut oil in place of butter, and sometimes grind the nuts into flour, from which a nutritious but rather indigestible bread is made. Roasted beechnuts are among the many substitutes in vogue for coffee.

BLACKBERRY.—For the cultivated blackberry the soil should be rich, dry and mellow. Barn-yard manure and bone-dust are its best fertilizers; it is a good plan to mix them with half-rotten straw, or some such thing. They should be planted three feet apart in the rows, and the rows should be six feet asunder.

BLIGHT IN FRUIT TREES, To Cure.—A smothering straw fire should be made early in October, in calm weather, under each tree, and kept up during an hour or more. This done, scrape the moss and other impurities from the trunk, and from every obscure hole and corner; set your ladders to the branches, carefully cleaning them in the same way, taking from the remaining leaves every web or nidus of insects. If need be, wash the trunk, and all the larger wood, with a solution of lime and dung. Last of all, it is necessary to destroy the insects and eggs which may have dropped upon the ground, and it may be useful to loosen the soil in the circumference. In the spring, or early blighting season, apply your ladders, make a careful survey of every branch, and act accordingly; repeat this monthly, picking off all blights by hand, and using the water engine, where ablution may be necessary. To those who have fruit, or the market profit thereof, every orchard or garden, little or great, will amply repay such trouble and expense.

BOYS, How to Attach to FARM LIFE.—One of the surest methods of attaching a boy to the farm is to let him have something upon it for his own. Give him a small plot of ground to cultivate, allowing him the proceeds for his own use. Let him have his steers to break, or his sheep to care for. The ownership of even a fruit tree, planted, pruned, and brought to bearing by his own hands, will inspire him with an interest that no mere reward or wages can give. In addition to the cultivation of a taste for farm life which such a course will cultivate, the practical knowledge gained by the boy will be of the highest value. Being interested, he will be more observant, and will thoroughly learn whatever is necessary for his success. Do not, when the boy is in a position to realize from the sale

of his produce or animals, (as many farmers very wrongly do,) take the money that is rightly his—the result of his care, labor and anxiety; but otherwise allow him to do just as his tastes and plans suggest. Another and equally important advantage will be the accustoming him early to feel responsibility. Many young men, though well acquainted with all the manual operations of the farm, fail utterly when intrusted with the management of an estate, for want of experience in planning for themselves. It is a great deal better that responsibility should be gradually assumed, than that a young man should be first thrown upon himself on attaining his majority.

BOULDERS AND ROCKS, (Big,) To Remove.—It is the opinion of some farmers that it is better to burn than to bury the granite rocks of which one may desire to relieve his fields. Make a slow fire across the rock in the direction in which you wish it to break; keep it up for one hour, more or less. When the rock begins to heat, thump on it with the point of a bar where it is hot, and if it has started a scale, remove it, and keep up your fire as before. The heat will swell the rock near the fire, and if the rock is sound will crack it where it is not hot. One man will break more hard rocks with fire in that way than a half dozen with drills and powder. Wood does not cost more than powder. You need not throw on water, as that will not do the least good.

BUGS, To Destroy.—The striped bug on cucumbers and melons may be destroyed as follows: 1. By a strong solution of hen-house manure—say 1 peck of the manure to $1\frac{1}{2}$ gals. of water; let it stand 24 hours, and sprinkle the plants freely with it after sunset. 2. By sifting charcoal dust over the plants; if repeated 3 or 4 times the plants will be entirely freed from the annoyance. 3. Plant a few kernels of buckwheat in each hill of cucumbers or melons, and striped bugs will not trouble the vines.

BUTTER, Management of the Milk.—The advantage gained during the hot season by the rapid and complete cooling of milk as soon as it comes from the cow, can hardly be over-estimated, as recent experiments show that the milk thus cooled will keep sweet much longer, and yield its cream more readily and abundantly; and, as all experience has proven that the quantity of butter made, depends greatly upon keeping the milk in such a state as to secure all the cream. A saving of labor is effected by this process, as the milk, when cooled to the required temperature, (60,) may be set in deeper vessels, thus diminishing greatly the number of vessels required, and, consequently, the labor of cleaning them. The milk may be cooled by setting some large pails into a trough or box partly filled with very cold water, and pouring the milk into these pails as fast as it is drawn from the cows, allowing it to stand until of the required temperature, and, if necessary, renewing the water. The pails used in milking should be made of tin—never of wood. It is very difficult—almost impossible—to cleanse wooden pails so perfectly that they will not impart some degree of acidity to the milk, though it may be an insensible degree. **The Dairy Room.**—Much of the success of butter-making depends upon the fitness of the place or room where the dairy is kept, and upon its condition as to cleanliness and freedom from

taints and odors of every description. If a cellar is used, it should be a dry one, and perfectly clean to the remotest corners, having no hidden remnants of decayed vegetables or fruit, or anything which could possibly offend the most delicate olfactories. If a room in the dwelling-house is used, or a milk-house, built separately, which is, perhaps, better, it should not be situated near a hog-pen, stable, or anything of the kind, nor should anything likely to impart its odor to the milk—as smoked ham, codfish, potatoes, onions, etc.—be allowed a place in the room. Nothing will receive a taint more easily than milk or cream; and all bad odors absorbed by the milk are certain to be concentrated in the butter, they not having the accommodating disposition to run off with the buttermilk. **Temperature.**—The milk, whether in a cellar or in a room above ground, should be kept cool in the summer, never being allowed to reach a temperature above 60°, though it may fall below that without detriment. Milk should be set upon racks, rather than shelves, so that the air may circulate freely under it, as well as over and around it. Racks are made in various ways; the most convenient we know of is constructed as follows: Take a 6x6 pine post, of a length suited to the height of the room, place it upright upon a pivot so that it will revolve, and nail slats of half-inch stuff to each side of the post, at such intervals as will give room for the pans or other vessels used. Two such slats nailed to opposite sides of the post, will support two pans of milk, one on each side of the post. The rotary arrangement allows one to stand in the same place to skim a whole rack full of milk. If pans are used, the seamless ones are best—but deeper vessels, either of tin or earthenware, are perhaps preferable, provided the milk is cooled before being set. **Washing the Utensils.**—The greatest care is requisite in cleaning these vessels, of whatever material and form, as also of all the other utensils employed in butter-making. This is a matter of much greater importance than many suppose, as the smallest neglect in regard to it is sure to tell upon the cream and butter. The pans and pails should be washed thoroughly, in two waters, each time being made as clean as possible with the water used; they should then be scalded thoroughly with boiling water. The churn, butter-bowl and ladle, or butter-worker, if one is used, should be washed and scalded with equal care, and all should be carefully wiped and dried, unless some arrangement is made for drying in the sun, which will do very well for tin and earthenware, and save the labor of wiping. In summer it will be necessary to see that all utensils are cooled perfectly before using them. **Skimming.**—The milk should be skimmed as soon as all the cream has risen, and before the milk has thickened. At the time the cream should be removed it will have a bright, healthy appearance, a rich, uniform, yellow color, and such an adhesion of particles as will enable one, sometimes, to remove the entire cream at one dip of the skimmer. If allowed to stand too long without skimming, both the quantity and quality of the cream will be seriously affected. The surface will become discolored, knobby, and blotched, while underneath the cream is rapidly yielding to the corrosive tendency of the acid in the milk. Yet, in order to make the largest quantity of butter, care must be taken

not to remove the cream too soon. The milk should all be skimmed at the same age, provided it has had the same conditions as regards temperature, etc.; it follows, then, that some milk should be skimmed every night and morning.

BUTTER, Winter Treatment in Making.—It will be found that in winter milk and cream require somewhat different management. The effort must now be to keep the milk warm rather than to keep it cool; and a failure in this respect will very materially affect the quality of the butter. If the milk is very much too cold, it will have to stand so long for the cream to rise that it will become bitter, often long before it turns sour, and the quality of bitterness will be still more apparent in the butter. To prevent this the milk should be kept at a temperature of 60° if possible; if not, the milk may be scalded as soon as strained, and the cream will then have a fair start before the milk has parted with this extra heat, unless the place where it is kept is very cold. If scalding is not found sufficient, two or three spoonfuls of sour milk (which has soured quickly and is not bitter) may be added to each pan of milk when it is set away. This will help to sour the milk and cause the cream to rise quicker, thus making it less liable to become bitter. It may also help to prevent bitterness to salt the cows often, and see that they do not eat decayed vegetables, or any substances which may impart a bad taste to the milk. The cream should be kept at about the same temperature, (60°,) and should be well stirred as often as new is added. It should not be kept too long before churning, never more than a week—four or five days is better.

BUTTER, Churning Cream for.—The cream should be churned at a temperature of 62° or 63°. A great deal of experience may enable one to guess at this temperature with tolerable cleverness, but it is better to use a thermometer and be sure. This temperature will be increased during the process of churning to 68°, or thereabouts, when the butter will come. If it should be hard and granular, refusing to come together well, throw in a little warm water, churning all the while, and the butter will soon be gathered and ready to take up.

Sweet cream should never be mixed with sour cream just before churning, as sweet cream is much longer coming, and hence likely to lose itself in the buttermilk. To salt the cows once a week is generally believed to facilitate the process of churning. In case they have not been thus salted, some put a little salt into the cream before churning; but we think that in most instances where butter is very long coming, it is owing to the temperature of the cream. It may be so cold as to require churning all day to bring the butter; a tax upon one's patience and one's strength, if performed by hand, equal to the cost of a dozen thermometers. Rapid churning must be avoided, for it not only affects the quality, but lessens the quantity. Churning should occupy from one-half to three-quarters of an hour in its operation.

BUTTER, COLORING.—As a rule, it is absolutely essential in the winter to color butter, in order to make it marketable, or at all attractive as an article of table use at home. There may be a possible exception to this rule, in cases where cows are fed largely upon yellow corn meal, pumpkins, carrots, etc., but this does not

lessen the importance of the rule. Of the various substances used in coloring butter, we think that carrots (of the deep yellow variety) give the most natural color and the most agreeable flavor. Annatto, however, is principally used, and with most satisfactory results. Some of the most celebrated butter-makers in the country color their butter with pure annatto, giving it a rich, deep orange color. If carrots are used, take two large sized ones, clean them thoroughly, and then with a knife scrape off the yellow exterior, leaving the white pith; soak the yellow part in boiling milk for ten or fifteen minutes. Strain boiling hot into the cream; this gives the cream the desired temperature, colors it nicely, and adds to the sweetness of the butter.

BUTTER, Improved Coloring for.—An improved coloring matter for butter—carotene—has been successfully employed by Dr. Quesneville as a substitute for annatto, to which it is in every respect superior, although somewhat more expensive. This carotene is the representative in carrot of alizarine in madder, and is obtained by slicing, drying, and grinding the roots to a powder, exhausting the powder with sulphide of carbon, and, having removed the solvent, rapidly crystallizing out the carotene from the extract.

BUTTER, Salting and Working.—While salt is not to be undervalued as a preserving agent, it must be remembered that too much of it destroys or overpowers the fine flavor and delicate aroma of the best butter. Be careful to preserve all the sweetness of the fresh butter, salting just enough to remove its insipidity. It is important to use the best salt. Pure salt is perfectly white and destitute of odor. It will dissolve in cold water without leaving any sediment, or throwing any scum to the surface, and the brine will be as pure as clean water, and entirely free from any bitter taste. The butter-milk should be nearly all worked out and the butter well washed before salting. Washing may abstract somewhat from the flavor of the butter, but it is, nevertheless, a necessity, if the butter is expected to keep long, as it completely removes the cream and casein of the buttermilk, a part of which might otherwise remain in the butter.

Butter should stand but a short time after it is salted, before it is worked enough to remove all the water, when it may be resalted if necessary; there should be sufficient salt left in the butter at this time to make a strong brine of the little water that remains. It may then stand until the next day, when it should be worked and packed. On no account should butter be allowed to stand long before working, as it is apt to become very streaked, often so much so as to necessitate its being worked over in order to restore a uniform color. Besides, if neglected too long at this period, a tendency to rancidity will be rapidly developed.

We realize the difficulty of giving explicit directions for the second and last working of the butter—its final preparation for packing. If not worked enough, every one knows that the butter will soon spoil; if worked too much, it is spoiled already; though the danger of its being overworked is less. A great deal of judgment and discretion, and somewhat of experience, are requisite in order to determine when it has been worked just enough; the virtue of stopping, in this, as in many other cases, being sec-

ond only to that of doing. There are some suggestions, however, which may prove valuable, particularly to those having little experience. 1. The butter should not be too warm when it is worked, nor should it be so cold as to make its working difficult. Immerse the ladle for a few minutes in boiling water, and cool perfectly in cold water; then, if the butter in the bowl is warm enough to admit of putting the ladle entirely through the whole mass without difficulty, and dividing it up without crumbling, and still hard enough to cut clean and smooth, not the slightest particle adhering to the ladle, then it is in the right condition to work. 2. It should be worked with careful and gentle, yet telling pressure, and not by a series of indiscriminate stirrings and mashings and grindings against the sides of the bowl. The butter is composed of minute globules, which are crushed by this careless handling, thus rendering the butter greasy and sticky, whereas it should retain its clean, solid individuality, up to the time of packing, always working clear from the bowl, and never sticking, in the least, to the ladle. 3. The butter should not be worked until it is perfectly dry. When ready to pack it should have a very slight moisture about it, a sort of insensible remains of the clear brine which has been working off, and at the last enough, so that when a trier is thrust into it, a drop or two of brine will ooze out around it, and the trier be slightly wet, as if by a light dew. Overworking destroys all the beautiful consistency of the butter, and makes it dry and sticky; greasy in summer and tallowy in winter; gives it a dull appearance, and a tendency to become rancid.

BUTTER, Packing and Marketing.—Butter should be packed solid, leaving no interstices for air, and should completely fill the firkin, tub, or pail, as the case may be, leaving a flat surface. It is common to put a cloth over the top, and a layer of salt on the cloth. Some think it better to wet the salt, making a brine. The cover should then fit tightly, leaving no room for air between it and the butter. Some butter, also, goes into market in the form of rolls, some pineapple, and other fancy forms for the table, etc. Every person should be guided by circumstances in his choice of styles for putting up butter, always being careful to give it a neat and attractive appearance. If living at a distance from market, and the dealers at his market-place buy for New York, he should pack in firkins or in tubs, so that the butter can be safely kept the entire season through, and the whole lot disposed of at once in the fall. If at a convenient distance from New York, fresh tubs or pails may be sent in at intervals, all through the season, or the whole kept through as he chooses. Or if in the vicinity of any city, good chances offer in the way of supplying hotels, restaurants, etc., the butter should be put up in a style to suit the customers. Some, who are hundreds of miles away, make shipments of butter to New York on their own account, instead of selling to buyers at home, in which case, if their butter is really superior, they will not be long in making a reputation, and will soon be able to secure a high price. Some few have a stamp of their own, and labor assiduously to establish a value for it as a trade-mark. It is said that the best butter-maker in the vicinity of Philadelphia (*who never sells for less than a dollar a pound*),

uses a stamp inherited from his father, and that "not a pound of inferior butter ever went to market with that stamp upon it." If you would attain to a goodly fame, then, as a butter-maker, and reap a rich reward for your pains, attend carefully to the minutest details in making, and never sell any but good butter, put up in neat packages; never allow your "trade-mark" to lose its value.

BUTTER (Rancid) To Restore.—Rancid butter may be restored by melting it in a water-bath with some fresh burnt and coarsely powdered animal charcoal, (which has been thoroughly freed from dust by sifting,) and strain it through clean flannel. A better and less troublesome method is to well wash the butter, first with good new milk, and next with cold spring water. Butyric acid, on the presence of which rancidity depends, is freely soluble in fresh milk.

BUTTER, To Preserve Fresh.—Melt it in a well glazed earthen pan, set in a water-bath at a heat not exceeding 180° Fahr., and keep it heated, skimming it from time to time, until it becomes quite transparent; then pour off the clean portion into another vessel, and cool it as quickly as possible, by placing the vessel in very cold water or ice. This is the method employed by the Tartars who supply the Constantinople market. In this state it may be preserved perfectly fresh for six or nine months, if kept in a close vessel and a cool place.

CABBAGE, CAULIFLOWER and LETTUCE.—Sow the seeds for early cauliflower, cabbage, or lettuce, about February 1, in well-prepared soil—say one-third each of leaf-mold, sand and loam; spread three or four inches deep on the benches of the greenhouse, or in boxes of about that depth. Keep a temperature of from 55° to 60°, and in three weeks they will be ready to replant—this time in boxes—at about 2½ inches apart each way for the cabbages, and 1½ inches for the lettuce. By the middle of March they will, if the temperature has averaged 55°, be strong plants, superior in every respect to those wintered over in cold-frames. By this date (the middle of March) the weather is such that they may be set out in cold-frames, and covered at night either with wooden shutters or sashes for five or six days, when they will be sufficiently hardened off to be planted in the open field. The conversion of sash that has been used on cold-frames into greenhouses is a very simple matter; two sashes of 6 feet in length, give, when placed at the proper angle, a width to the greenhouse of 11 feet; 2 feet of this space is used as a walk; the remainder, 9 feet, for bench room, on which to grow plants. The outer walls may be formed of wood.

CABBAGES, The Cut Worm on.—To prevent the ravages of the cut worm take pieces of newspaper six inches square, tear a slit in one side to the centre and insert the plant. Bring the slit edges together, and place a little earth or a pebble on the corners, and the work is done. A platform of paper is formed around the plant, through which the worm cannot penetrate.

CABBAGE PLANTS, SALTING.—The use of salt is said to make the cabbage more crisp, of better flavor, and to keep better when salt is used, than without. After setting out the plants, and when they are damp, either after a rain or when the dew is on, take a small dish of

fine salt and walk among the rows, sprinkling a little pinch of salt on the centre leaves of each plant: when the leaves begin to grow you repeat the salting, and when the centre leaves begin to form the head, apply salt again, scattering it over the leaves; after this look them over occasionally, and if you find any plants that do not head well or appear diseased, sprinkle the salt over freely; this will save all such plants. A quart of salt is sufficient for 500 plants in a season, although more can be used with safety.

CARROTS, To Cultivate.—Select a good, rich clover sod, deep loamy soil, or even gravelly, well drained; spread on evenly fifteen to twenty ox-cart loads of good manure to the acre. In the spring, after the ground is well settled and dry, with settled warm weather, plow the ground thoroughly, eight inches deep, or more, depending upon its previous management. In plowing it ought not to be plowed more than an inch deeper than before, unless the deeper soil has been ameliorated and is richer than the upper soil. A soil having a close, stiff subsoil, unless thoroughly subsoiled, will grow poor crops of roots generally. After plowing, harrow so as to make the soil perfectly fine, and even this is essential to the ready drilling and germinating of the seed; now drill in the seed, putting the drills two feet apart. The seed should be fresh and of the previous year's growth. It is best to commence the culture as soon as the rows can be distinguished. Have a cultivator of light frame, with eight teeth, similar to the coulter of a plow, only narrower, and about ten inches long, and a shovel for the front. With this and a horse go through, cutting the soil deep close to the rows without covering the plants; this will save the greatest part of the work usually done with the hoe, and do it much better. When the carrots are well growing and about the size of the small end of a clay pipe stem, take a narrow hoe and cut them into hills, thinning them to four or five inches apart. The after culture is performed with the cultivator, going through once in about two weeks. If any weeds come in the rows, pull them out by hand—but it is not probable that weeds will trouble if the soil be selected as above, and well prepared before planting, and the culture as directed. To harvest, it is best to take a sharp hoe with a short handle and clip off the tops close to the crown, gather them, and then plow around a plat a deep furrow, as close to the roots as you can go; now take them by hand and draw them out, and throw four or more of the rows into one. Carrots should be taken out when the ground is dry, and lie a few hours to dry, and then be hauled to the root cellar to be stored, and if in tight bins and covered with sand they will keep better. They should be left in the ground to ripen as long as safe without freezing, as they improve till freezing weather; and keep fresher than if gathered before fully matured; be careful not to let them remain too long to get frosted, for a light freeze injures the carrot more than other roots.

CATS CATCHING CHICKENS, To Cure.—When a cat is seen to catch chickens, tie one of them around her neck, and make her wear it for two or three days. Fasten it securely, for she will make incredible efforts to get rid of it. Be firm for that time, and the cat is permanently cured; she will never again touch a bird.

CELERY, To Cultivate.—Celery seed usually germinates slowly, and the plants are exceedingly small and tender when they first appear; consequently a carefully prepared seed bed is positively necessary. If there are no hot-beds that can be used for this purpose, select a warm spot on the south side of a fence or building, and as soon as the frost is out of the ground dig up a bed, say three feet wide and ten feet long, cover it with fine manure, two to four inches deep, and dig it in and mix it with the soil. Rake the bed level, and sow the seeds evenly over one-half the surface, leaving the remainder vacant, and for use when the plants are large enough for their first removal. Pat down the surface with the back of a hoe or spade, and this will usually cover the seed sufficiently deep; if not, sift on a very little fine soil. Give the bed a good soaking of tepid water, applied, if possible, through a watering pot with a fine rose. It will not do to dash on water with a pail or some similar vessel.

The seed bed must be frequently watered until the plants appear, and thereafter sufficiently to keep them growing. If the plants come up too thickly, thin them out; but as soon as large enough to handle, take up and transplant into rows, beginning on the vacant end of the bed, placing them four inches apart each way; and a bed of the size named will hold about three hundred. The plants may remain in this position until wanted for final planting in the garden, which is usually done from the first to the middle of July. Plants that have been transplanted in the seed bed can be safely removed at almost any time, whether the weather is moist or dry. In the *Final Planting*, it is best to adhere to the old practice of trench planting for ordinary garden culture. A trench is dug of the required length, or several of them, four feet apart, and one spade deep, which, as a general thing, will not be more than six or eight inches, and about a foot wide. This trench is then half filled with fine stable manure, and this is mixed into the soil in the bottom of the trench. The trench, when thus prepared, will be about four inches deep, exclusive of the soil, which has been cast out upon either bank. The plants are then set in the centre of the trench six inches apart, and, after planting, carefully watered. The reason why a shallow trench is most desirable is because of the convenience of watering, as when applied it is sure to reach the roots, and not spread over the surface, as when level culture is adopted. From this time forward, until the blanching is commenced, all that is required is to keep the plants growing by careful culture, such as frequently stirring the soil and giving water when required.

CELLARS, To Keep from Freezing.—The following experiment was tried by a gentleman with the cellar of an out-house, in which on several occasions vegetables have frozen, though the cellar was fortified against frost by a process known to farmers as "banking." The walls and the ceiling were pasted over with four or five thicknesses of newspapers, a curtain made of the same material being also pasted over the window at the top of the cellar. The papers were pasted to the bare joist over head, leaving an air space between them and the floor. The result was that no frost entered the cellar, though the cellar was left unbanked. We do not coun-

rock which skirts the village; the temperature of these recesses is kept low by various contrivances, and seldom rises above 4° Cent. (41° Fahr.) The cheese is made with the milk of the morning and of the evening before.

CHEESE, DUTCH.—This is the curd of sour milk drained from the whey, pressed into balls or molded in small fancy shapes, and eaten when fresh, or soon after it is made.

The milk is allowed to sour and become loppered or thick, when it is gently heated, which facilitates the separation of the whey. The curds are then gathered up, salted, or otherwise, to suit the taste, and pressed in small molds, or formed with the hand into suitable shape, when it is ready for the table, and may be used immediately. In cool weather, when milk does not readily thicken, the sour milk may be put in a suitable vessel set in hot water over the range. The milk is then stirred for a few minutes, when the whey will begin to separate, and it is then removed, and another batch may be treated in the same manner.

Sometimes this kind of cheese is potted and left to decompose, and when it has acquired a strong, villainous smell, it is regarded as most delicious by those who have acquired a taste for eating it in this state. In some markets cottage or Dutch cheese finds a ready sale, and quite a profit is made by certain butter-makers, in turning their sour milk into this product.

CHEESE, NEUFCHATEL.—Neufchatel cheese, in its manufacture, differs from the above (Dutch cheese) only in being not allowed to ripen so long, two or three weeks being considered enough. Variations of this cheese are made by adding some chopped herb—the favorite is sage—and not allowing the cheese to ripen over three or four days.

CHERRIES.—The cherry, as a rule, luxuriates in a warm, sandy soil, in an elevated situation; but some of the best varieties will thrive in all soils and aspects. In order to obtain this fruit early, some of the varieties are planted up against walls, but all the sorts do well as dwarfs or espaliers in general situations, and most of them as standards. Full standards should be planted from twenty to thirty feet, and the small standards from fifteen to eighteen feet apart. The proper season for planting is from the end of October till February or March. Varieties of the cherry are perpetuated by grafting or by budding on stocks of the black or red wild cherries, and new sorts are procured from cherry stones, which are preserved in sand from the autumn till spring, and then sown. The plants come up the same season, but should not be removed till the second autumn after sowing, when they may be transplanted into rows three feet apart, the plants being placed from a foot to fifteen inches apart in the row. Next summer they will be fit to bud if intended for dwarfs; but if for standards, they should be allowed to stand one or more seasons, generally till they are four years old. They should be budded or be grafted about six inches from the ground, the usual way being to bud in summer, and to graft those which do not succeed the following spring. There are various methods of training the cherry, when grown on walls or espaliers, which, of course, must be left to the judgment of the grower. Occasional pruning is all that is required, the object being to remove any irregu-

larity in cross placed or overcrowded branches, and to take away all canker and decayed wood.

CREAM, CLOTTED (as Made in England.)—The dairy-house is of stone, in connection with the dwelling—stone floor, and stone benches for the milk to set, and all well ventilated and scrupulously neat and clean. Their milk at this season of the year is strained in very large, deep pans, and put in the dairy-house, where it stands from eight to ten hours, when the pans are taken out, and the milk scalded by the pan in an iron skillet, filled with water, and placed upon the range. At the bottom of the skillet there is a grate, on which the pan of milk rests, so as to keep it from the bottom, and from burning. The milk is here slowly heated, until the cream begins to show a distinctly marked circle around the outer edges, when it must be immediately removed. Some experience is necessary in applying the heat, to have it just right, otherwise the cream is spoiled. When properly scalded, the milk is removed to the dairy, where it stands from twelve to twenty-four hours, according to the condition of the weather, when the cream is removed, and is in a thick, compact mass, very much unlike our ordinary cream. It is considered a great delicacy, and is largely used as a dressing, with sugar, upon pastry, puddings, etc.

CLOVER, How Cured in Germany.—A farmer provides in winter a number of stakes from three to four inches thick and seven to eight feet long, about eighty or one hundred to an American acre. In each of the stakes six holes one inch wide are bored in this way: Suppose that the stake is firmly planted in the ground, the first hole is bored two feet above ground from north to south, the second three inches higher from east to west, not quite half way from the first hole to the top of the stake hole. No. 3 is bored again north and south, three inches higher; hole No. 4, east and west. A little below the top come holes Nos. 5 and 6. Through these holes sticks about five to six feet long are put, so that, seemingly, twelve sticks of about equal length protrude from the stake, crossing each other at right angles. On these sticks the clover is put, either right away after mowing, or a little wilted, and there left to dry. This makes a better, more nutritious hay than the best sunshine would, and rains do not much harm, particularly if care is taken to spread the clover well on the two top sticks. The whole fixture is called a "heintzen," and is mostly used on deep clay soils, where the holes for the stakes can be made easily by a peculiar kind of borer. For stony grounds the pyramids are used. Three stakes, six to seven feet long and two to three inches thick, are bored near the top, and then joined there by a wooden or iron bolt, on which they can turn. This pyramid is then put upright on the ground. Small pegs are fixed in each limb. From one peg to the other on the next limb sticks are laid, and on the sticks come the clover. The number of pyramids wanted for an acre is one-half of the "heintzen," and, as old rails will answer for the limbs, the pyramids would probably suit the American farmer best.

CORN.—In the cultivation of corn, the best time to plow is just previous to planting. Do not commence too soon—not until the ground will turn up mellow; every one should calculate

about the amount of time it will take to fit the ground, and if too wet when you wish to commence, perhaps the plowing can be safely delayed a few days.

Let all the grass grow that will previous to the first of May; all weed seeds in manure and on the surface of the ground will by this time be sprouted, and with the grass make almost an extra coat of manure.

In plowing, commence in the centre of the field, back-furrowing the whole field, thus you will have a field with not a particle of it trodden solid in turning, as you turn each corner on unplowed land and with no dead furrow; a little practice will enable you to finish without carrying a furrow.

As soon as plowed harrow well; a good plan is to harrow each morning that plowed the previous day. The proper time to plant—let the location be what it may—can be determined by observing the natural vegetation and the warmth of the soil. Whenever the ground is warm enough to cause a speedy germination and growth, then is the time to plant. This can be ascertained by plunging the lower end of a thermometer into the ground. If the mercury goes much below 60°, there is no use in putting corn seed in. A generally safe rule is to plant when the apple is in full bloom.

Much has been said in regard to hills *vs.* drills. It has been found that the best results will be found in planting in drills about three and one-half feet apart, and putting hills about eighteen inches apart, leaving only two stalks to each hill.

The great difficulty with those who drill is that they do not thin sufficiently. Drills should run north and south. Three inches is about the correct depth for planting. As soon as the corn begins to push through the ground start the drag, going diagonally across the drills, paying no attention to the corn; for if planted at that depth you will not destroy a hill; go over the piece at least once each week until the corn is of such a height that the drag will break it off, when use a wheel cultivator, or any of the various implements. The thinning should be done about the last of June, and directly after harvest go over it and cut out any remaining weeds, etc.

CORN COBS.—In shelling corn most farmers throw the cobs into the manure pile. This is poor economy, as they are slow to decay, and are a source of perpetual trouble. Rather put them into the wood-house, or some other dry place, and use them as fuel; they make a quick and very hot fire, excellent for summer use, and excellent kindlings. A few shavings and one or two handfuls of dry cobs will start a fire as quick as any kindlings ever used, and the ashes make the best of soap.

CORN, To Prevent Being Destroyed When Newly Planted.—To prevent the corn being destroyed or eaten by chickens, birds, or insects, before it grows through the surface of the soil, prepare the seed before planting by sprinkling a sufficient portion of coal tar, procured at the gas manufactory, through it, stirring so that a portion will adhere to each grain; then mix among the corn some ground plaster-of-Paris, which will prevent the tar from sticking to the fingers of those who drop the corn, and vegetation will be promoted thereby. The tar and plaster will *not* injure the corn so as to prevent its growing,

by being kept some days after it is so mixed together.

CORN STACKS, To Prevent Ravages of Mice in.—Sprinkle from four to six bushels of dry white sand upon the roof of the stack before the thatch is put on. The sand is no detriment to the corn, and stacks thus dressed have remained without injury. So very effective is the remedy, that nests of dead young mice have been found where the sand has been used, but not a live mouse could be seen.

CORN CRIBS, RAT-PROOF.—Take posts 10 or 11 feet long and 8 inches square; mortise 2 feet from one end; for end-sills, 2-inch mortise with tusk. Taper post from sill to the end, by hewing off inside until the end is reduced to 4 inches diameter; make smooth with the draw-knife, and nail on tin smooth half way to the end, below the sill. Let sills be 8 inches square, also end tie them and the rafter plates strong with moderate inter-ties. Brace well, and lath up and down with $\frac{3}{4}$ inch lath; dove-tail or counter-sink joints crosswise; lay the floor, and board up the ends with ungrooved boards; let each bend be 12 feet long, 6 feet wide at the sill, and $7\frac{1}{2}$ feet at plate; and, if full to peak, it will hold 250 bushels. If preferred, lay the floor with lath or narrow boards, with room for ventilation. Each post should stand on stone, and be about 3 inches from the ground, and each stone have a foundation 2 feet square and below the frost.

CORN, BROOM.—Broom corn should be planted at the same time Indian corn is planted. It requires a richer soil than Indian corn—at least Indian corn will produce a better crop on a less fertile soil than is required for broom corn, in consequence of its growing faster, and feeling the effects of fertilizers more perceptibly. Bottom lands on the banks of rivers that are annually overflowed in early spring are particularly adapted to the growth of broom corn. It is sowed in drills, about three feet apart, and the corn thinned out to stand from four to six inches apart. Any good upland soil that consists of a rich mould, easily tilled, will produce an excellent crop of broom corn, with the aid of barnyard manure or other fertilizers. It requires careful cultivation, by running the cultivator between the rows as soon as the corn is well up; and then the rows require hand-weeding, and thinning out to the proper distances. Boys and girls can do this work better than men can, and at one-third the expense that it would cost to employ men to do it. No weeds should be permitted to grow, as the value of the crop depends on the cleanness of cultivation.

The seed is valuable for fowls, and for every kind of live stock when ground; and some cultivators think that the seed alone is worth the cost of cultivation.

COTTON.—The most suitable soil for the cotton plant is a rich loam. It cannot be too rich, and it is a poor crop on poor land. Cotton has been raised with success in Delaware, and even in Pennsylvania, but the finest long-staple cannot be produced so far north.

The seed are planted in hills, the rows three or three and a half feet asunder, and the plants about two feet apart in the row. After springing it should be thinned to one plant in a hill. The season for planting is as early as the ground can be prepared. The soil should be well cul-

tivated, and care should be taken to keep it free from weeds.

In the fall, when the pods open, it must be gathered every day and stowed away until there is a sufficiency to run through the cotton gin, which cleans it of seed. It is then packed in bales, when it is ready for market. The yield of cotton per acre is from 500 to 1,000 pounds, according to soil, cultivation, season, etc.

CRAWBERRIES.—The most favorable location for the cultivation of cranberries is where the soil is peat from one to several feet in depth, and where the surroundings are such that during the summer months the water can be thoroughly drained off at least one foot below the surface, and at the same time such that the water can be let on in a few hours in a sufficient quantity at any season of the year to cover the surface from 4 to 6 inches in depth; and also in the vicinity of a good sand-hill.

In preparing the soil, the surface should be removed down to the peat; it should then be covered at least with 3 inches of sand, or, when this cannot readily be found, fine gravel will answer a very good purpose.

In selecting plants, care should be taken to use only such as are known to produce good crops. It is found that while some varieties can produce 4 bushels to a rod, others, on the same soil and with the same care, will produce only 1 bushel. The month of May is undoubtedly the best time to transplant the vines. The water at the time should be nearly even with the surface, and kept so for a week or 10 days, and then be gradually drawn off. The vines should be set singly, about 6 inches each way. The first season great care should be taken to keep out all grass and weeds—after that, if the location be a good one, and the plants properly set, but little labor will be required to keep down the grass: if possible, they should, during the winter, be kept covered with at least 2 feet of water, nor should they be left entirely out of water until all danger of frost in the spring is over; for—what is very singular—while the blossom buds are able to withstand our coldest winters, a very slight frost the last of May will kill them, and entirely ruin the crop. This is a fact not so generally known as it should be. When the worms make their appearance, the flowing of the land for a few hours is sufficient to destroy them. If during the month of September there should be any days which promise to be followed by frost, the water should be let on and the fruit thus protected.

CUCUMBERS.—In cultivation, the cucumber ordinarily requires a deep and rich soil, an abundance of moisture, and continued heat. Its nature is to support itself by its tendrils in an upright position upon pieces of brushwood, in which manner the cleanest and best fruits are to be obtained. This, by the way, will be found to be a good practice, too, where there is but little room for a horizontal growth upon the ground.

Cucumbers, also, like most varieties of melons, have been found to possess in the leaves immense perspiratory power, so that they require a greater supply of fluid than those of most other plants, which accounts for the singular fact that they seem to thrive best where the roots find their way to an abundant supply of water. Such a supply of moisture is requisite

under exposure to an intense sunshine, the heat and bright light of which decompose and alter the fluids of the plants, and elaborate from them an abundance of sweet juices. This is peculiarly so with melons in hot climates; and experience has demonstrated that the moisture must be applied to the roots, and not upon the surface of the soil upon which they grow, so as not to cool the surface, check the growth, and kill the plants.

The plan recommended is as follows: Take a tight barrel or cask, remove one head, and partially fill the barrel or cask with large pebbles or stones, say half full; upon these stones place a mixture of compost with rich alluvial soil, or fine fresh vegetable mold, until the barrel or the cask is filled to within 3 or 4 inches of the top; in which plant the seed, and cover to the requisite depth. This barrel or cask may be placed in any convenient situation where sufficient room or space can be obtained, and around which arrange lattice work or brush to sustain the outspreading plants in whatever manner may be found most convenient for affording access at all times to both the barrel and the plants.

Upon the outer side of the cask insert a pipe of convenient size, through which water may be introduced to the lower or under half of the cask daily, or as often as occasion may require; this portion of the cask should be kept constantly filled with water. Mid-way of the cask the staves should be perforated with several half-inch holes, for the free escape of any surplus water, and at the same time to permit the admission of an equal distribution of air; this purpose would be better accomplished if the holes were bored upon a line at equal distances apart around the cask.

The effect of this arrangement, as will be seen at once, is that through the capillary attraction of the soil sufficient moisture is absorbed at all times to nourish the plants, while the admission of air can be controlled at pleasure by opening or closing the apertures upon the sides of the cask.

CURCULIO.—To annihilate curculio, make a very strong solution of gas-tar and water, so that after standing a couple of days it will be dark-colored, and as pungent as creosote. On the first appearance of the curculio, with a small hand-forcing pump (which every gardener ought to have) give the trees an effectual drenching, and repeat it every three days for two weeks. As a preventive measure, destroy all the fruit as it falls, and this can best be done by allowing your fowls free range of the orchard.

DAIRY, Charcoal in the.—The power of milk to absorb the noxious gases and odors from the atmosphere is known to every dairyman, and this power extends also to all productions made from milk, be they cream, butter or cheese. Much of the bad flavor in butter and cheese is not caused so much by anything derived from the cow, or the food which she eats, as by the odors imparted either to the milk after it is drawn, or to the cheese after it is made, and before it is put in the cloth and rendered impervious to atmospheric influences. Hence the necessity of the greatest efforts being made, not only to keep the dairy and every utensil used in a state of the most perfect cleanliness, but also the attendants should be in every way cleanly in person, and the air kept pure and uncontaminated by any

odors whatever. To do this, charcoal, finely powdered, is probably the best and cheapest article that can be used. It is capable, when it is fresh, of absorbing ninety times its own volume of ammonia or other gases, which can again be driven out of the charcoal by the application of heat.

DRAINING.—A cheap mode of draining is, instead of digging the ditch altogether with a spade, to use the plow, taking a land 15 or 20 feet wide, and leaving the dead furrow where the drain is to be. By plowing several times the dead furrow may be sunk nearly 2 feet, and from the bottom of this a trench, the width and depth of the space, may be thrown out, and a drain made of 3 fence boards (4 inches wide will be sufficient) in the shape of the letter V, may then be put into this branch, and the plowing reversed till the ground is made level. This method has a double advantage—1. It is a cheaper method than to dig the full depth by hand, and the work is cheaper than tile. 2. By turning up and thus loosening the subsoil to that depth on each side of the drain, the water would find its way into the drain more readily than if only a narrow ditch had been dug from the surface down, leaving the sides unmoved and almost impervious to water.

DOCKS, To Eradicate.—Cut them off close to the ground when the tops are fully out, but the seed not fully formed, and they are done for. The stalk dies in the ground; but you must cut them so close to the ground that you leave no leaves on the stalk, else they will not die. The end of June is generally about the best time to cut them; but it depends on the season. In the pasture-fields they are soon cut with a scythe. In wheat and meadows they have to be cut with a knife.

FARM LIFE, How to Make Attractive.—1. By less hard work. Farmers often undertake more than they can do well, and consequently work too early and too late.

2. By more system. Farmers should have a time to begin and stop labor. They should put more mind and machinery into their work; they should theorize as well as practice, and let both go together. Farming is healthy, moral and respectable; and, in the long run, may be made profitable. The farmers should keep good stock, and out of debt.

3. By taking care of health. Farmers have a healthy variety of exercise, but too often neglect cleanliness, eat irregularly and hurriedly, sleep in ill-ventilated apartments, and expose themselves needlessly to cold.

4. By adorning the home. Books, papers, pictures, music, and reading, should be brought to bear upon the in-door family entertainments; and neatness and comfort, order, shrubbery, flowers and fruits should harmonize all without. There would be fewer desertions of old homesteads if pains were taken to make them agreeable. Ease, order, health and beauty are compatible with farm, and were ordained to go with it.

FARMING, Rules for Success in.—1. Never purchase land on credit, unless it be in a new country where it is certain to enhance in value rapidly.

2. Keep no more live stock of any kind than you can keep in good condition.

3. Never allow your stock to suffer from cold,

by housing them in open, rickety buildings, and remember that warm, comfortable stables are a saving of one quarter of the feed that otherwise would be required.

4. If your farm is so large that you cannot cultivate all of it to advantage, nor keep good fences on it, sell a part, and put the money out to interest. You may depend that by so doing you will save a great deal of care and trouble, and make money faster than by skimming over a large surface to get poor crops, and those half destroyed by unruly cattle breaking over your dilapidated fences.

5. Look well to your orchard, and remember that it costs no more to produce apples that sell for fifty cents a bushel than it does those that sell for twelve and a half cents.

6. Keep none but the best implements that can be produced, and when you possess them take care of them. It is shocking to a good farmer to see his neighbors leaving their plows and harrows in the field week after week, to soak in the rains and crack in the sun.

7. Never suffer yourself to be unprovided with suitable work for yourself and hands on a rainy day. A commodious workshop is necessary on such days, and a plenty of good tools. In such cases a good farmer will never lack for work. Much money may be thus saved that otherwise would go to the wheelwright.

8. Never borrow tools, unless it be in some unforeseen contingency. Every farmer should own every kind of implement necessary on his farm.

9. Never put off till to-morrow what may as well be done to-day. Thousands of tons of hay have been ruined by not heeding this rule.

10. Do all your work well. What is worth doing at all, is worth doing well.

11. Don't try to make merchants, lawyers, physicians or clergymen of your sons, because the farmer's vocation is without honor. Gen. Washington was not ashamed of being a farmer, and you are no better than he was.

12. The soil must, like the horse or the ox, be fed, in order to give forth abundantly, and it must have rest. A judicious rotation of crops is the grand secret of prosperous farming.

13. The manure heap is an important consideration with the farmer. It should be increased by all substances that are easily procured, of a decaying nature. Remember that ammonia is the essence—the life of all manures, and that plaster absorbs it, and retains it in the heap, while lime sets it free and causes it to escape. Carting manure to the field, and leaving it in heaps for months or weeks before it is spread and plowed under, is but one step short of insanity. It should be carted out no faster than it can be spread and plowed under.

14. Never leave your hired hands to work alone. Be present with them, even if you do nothing but look on. A pair of eyes will sometimes do wonders with workmen.

15. The farmer who refuses to lay before his children several good periodicals of the day, including one agricultural paper, is allowing his wealth and the usefulness of his family to run away at the bung, while he is saving at the spigot.

FARMERS, Sleep for.—Said one of the oldest and most successful farmers in this State: "I do not care to have my men get up before

five or half-past five in the morning, and if they go to bed early and can sleep soundly, they will do more work than if they got up at four or half-past four." We do not believe in the eight-hour law, but, nevertheless, are inclined to think that, as a general rule, we work too many hours on the farm. The best man we ever had to dig ditches seldom worked, when digging by the rod, more than nine hours a day. And it is so in chopping wood by the cord—the men who accomplish the most, work the fewest hours. They bring all their brain and muscle into exercise, and make every blow tell. A slow, plodding Dutchman may turn the grindstone of a fanning-mill better than an energetic Yankee, but this kind of work is now mostly done by horse-power, and the farmer needs, above all else, a clear head, with all his faculties of mind and muscle light and active, and under complete control. Much, of course, depends on temperament, but, as a rule, such men need sound sleep and plenty of it.

FENCE-POSTS, Preservation of.—Any sort of timber, when employed for fence-posts, will be more than twice as durable if allowed to become thoroughly seasoned before being set in the ground. The durability of seasoned posts may be promoted, so as to make them last for an age, by the application of a heavy coat of coal-tar to the portion buried in the earth, and a few inches above the surface of the ground. Some farmers set the ground-end in hot tar, and let it boil fifteen minutes. When cool, cover with coal-tar, thickened with ground slate or ground brick. The boiling stiffens the albumen and causes the pores to absorb tar. The coating prevents the action of moisture. But such a treatment of green posts would do very little good, and perhaps mischief. Others contend that the better way is to season the post well before setting it, and, when the post-hole is filled to within 10 inches of the surface of the ground, to apply a heavy coat of tar and fill up with earth. As fence-posts always decay first near the surface of the ground, it is only necessary to protect the post a few inches above the surface, and about a foot below it. The timber begins to decay, usually, on the surface of the posts. Therefore, if the surface can be protected by some antiseptic material, posts will last a lifetime.

FLY ON TURNIPS, To Destroy.—Take 1 bushel of newly slaked lime, and mix therewith $\frac{1}{2}$ a bushel of wood ashes; mix and blend the whole intimately together, and sift the powder lightly along the top of the drills.

FRUIT TREES, Over-bearing.—The bending of branches of trees by an over crop of fruit is most injurious; for the pores of the woody stalk are strained on one side of the bend and compressed on the other; hence the vessels through which the requisite nourishment flows being partially closed, the growth of the fruit is retarded in proportion to the straining and compression of the stalk.

FRUITS, To Gather.—In respect to the time of gathering, the criterion of ripeness, adopted by Forsyth, is their beginning to fall from the tree. Observe attentively when the apples and pears are ripe, and do not pick them always at the same regular time of the year, as is the custom with many. A dry season will forward the ripening of fruit, and a wet one retard it, so that

there will sometimes be a month's difference in the proper time for gathering. If this is attended to the fruit will keep well, be plump, and not shrivelled, as is the case with all fruit that is gathered before it is ripe.

The art of gathering is to give them a lift, so as to press away the stalk, and if ripe they readily part from the tree. Those that will not come off easily should hang a little longer; for when they come off hard they will not be so fit to be stored, and the violence done at the foot-stalk may injure the bud there formed for the next year's fruit.

Let the pears be quite dry when pulled, and in handling avoid pinching the fruit, or in any way bruising it, as those which are hurt not only decay themselves, but presently spread infection to those near them; when suspected to be damaged, let them be carefully kept from the others, and used first; as gathered, lay them gently in shallow baskets.

FRUITS, Time for Gathering.—This should take place in the middle of a dry day. Plums readily part from the twigs when ripe; they should not be much handled, as the bloom is apt to be rubbed off. Apricots may be accounted ready when the side next the sun feels a little soft upon gentle pressure with the finger; they adhere firmly to the tree, and would over-ripen on it and become mealy. Peaches and nectarines, if moved upwards, and allowed to come down with a slight jerk, will separate, if ready; and they may be received into a tin funnel lined with velvet, so as to avoid touching with the fingers or bruising.

A certain rule for judging of the ripeness of figs is to notice when the small end of the fruit becomes of the same color as the large one.

The most transparent grapes are the most ripe. All the berries in a bunch never ripen equally; it is therefore proper to cut away the unripe or decayed berries before presenting the bunches at table.

Autumn and winter pears are gathered, when dry, as they successively ripen.

Immature fruit never keeps so well as that which nearly approaches maturity. Winter apples should be left on the trees till there be danger of frost; they are then gathered on a dry day.

FRUIT, Sun-printing on.—Monograms, initial letters, or other designs, can be printed on such fruit as apples, pears or peaches by the action of the sun, with very pretty effect, of either a light or dark color. To do this, draw the monogram, letter or design on a piece of writing paper, and paste it with mucilage or glue upon the side of the fruit exposed to the sun. Just before the fruit begins to color, and when the fruit is ripe, and the paper is removed, the design will appear in a lighter or different color to the rest of the fruit; as, for instance, if the experiment is tried on a yellow-fleshed peach with a red cheek, the design will appear in gold, surrounded with red. If the opposite effect is intended, take a small oval or circular piece of paper, and cut out or pierce the letter or design in it, and paste on the fruit, which, when ripe, will have the design in high color on a yellow or on a light green ground of the shape of the piece of paper, and this again will be surrounded by the brighter color of the fruit.

FRUIT TREES, To Protect from Rabbits.

—To protect fruit trees in the winter from rabbits, it is recommended to make a strong decoction of tobacco, simmer it down in lard to the consistency of thin paint, add a little soft soap, stir well, and it is ready for use. Apply with a brush or swab from the root of the tree upwards until above the reach of the rabbits. This dose would seem calculated to spoil the appetite of the hungry depredators of whatever kind. See also "Apple Trees, To Keep Rabbits from Barking."

GARDEN SPIDERS, To Destroy.—Various kinds of fruits and plants, both in the garden and the hot-house are frequently infested with insects, such as aphides, earwigs, red spiders, and other pests. The vine, the peach, the melon, the cherry, the currant, and some humbler plants, afford them appropriate places of abode, to the discomfort of the gardener and the detriment of his fruit. Several modes of expelling these pests have been devised. One of the most successful is that of frequently washing the plants and fruits by means of the watering-pot and rose. This itself will vastly diminish their numbers, and at length destroy them. Lime-water, however, will be found much superior to common water for the purpose, care being taken that the fluid shall reach the lower sides of the leaves, and those parts of the twigs and branches in which the insects take refuge. Six o'clock in the morning is an excellent time to perform the work. And when the leaves and fruit have been thoroughly washed, care should be taken to completely shade the plants in the hot-house or the forcing-house with matting, to prevent injury to them from the heat of the sun while they are in a wet, cool state. The washing may be repeated about three o'clock in the afternoon.

GARDENING, WINDOW.—*Soil.*—The first point is good soil—without this no plant can thrive well. Fresh sandy loam, with a third of well rotted manure, will do for many plants; and keep a reserve stock of soil in a heap, and turn it over occasionally, then it will be ready for use. In potting, press the soil well down in the pot, and never use wet soil for this purpose on any consideration, or disappointment will be your inevitable reward. See that the pot used is not too hard burned, as in that case it becomes almost non-porous and unfit for plant culture. *Heat.*—Most plants will survive if the temperature gets below 40°; but no healthy growth or bloom can be looked for at a lower average daily temperature than 60 or 65°; it is better that the night temperature should fall 15° less than this. One difficulty with plants in our dwellings is that they are as hot at night as during the day. *Water.*—Give water only when the plants need it. A plant with its roots constantly in mud cannot thrive. It is better to wait until the flagging of a plant shows that it needs water than to keep it constantly soaked. Sprinkling or showering should be done as often as possible. Take the plants to a sink or a bath-tub and give them a good dousing. *Air.*—Do not be afraid of opening the windows whenever the outside air is not freezing. Give air every day when it is safe to do so. Not only will the plants be benefited, but the atmosphere will be better for human beings. Dust is a great obstacle to the growth of plants in the house. The showering we have recommended will help to remove it; but all the smooth-leaved plants, such as camelias, ivies,

and the like, should be occasionally sponged to keep the foliage clean and healthy. *Insects.*—Don't have any. If the plants are daily looked over, and the thumb and finger properly applied, they will be kept in check. If a plant is badly infested by the green fly, put it in a box or under a barrel and smoke it thoroughly. If the red spider appears, as it will be apt to do in hot and dry rooms, smoke will not help it. Remove the plant into hospital and shower it daily. Frequent wetting and a moist atmosphere is the best remedy.

GARLIC.—The common garlic is propagated usually by offsets known technically as "cloves"—that is, the old bulbs are pulled apart, and the small divisions planted in spring. They are usually set in rows eighteen inches apart, and the sets four to six inches in the rows; plant with a dibble, or by thrusting them into the soil with the fore finger and thumb. Give them the same culture as onions, gathering in autumn, and tie in bundles, the tops being left on for this purpose. The young bulbs will throw up long stalks, and if not checked are very likely to run to seed, which must be prevented by breaking down the stems, or tying them in a knot, which is the practice of European gardeners. Garlics are mainly used by foreigners, especially the Germans, and by our people for medicinal purposes.

GRAFTING WAX.—1. Take 1 lb. of tallow, 3 lbs. of beeswax, and 4 lbs. of resin; put into a kettle and melt slowly until all the ingredients are combined. If to be used in the open air in cool weather, add a $\frac{1}{4}$ to $\frac{1}{2}$ lb. more tallow. Melt the resin first, and be sure it is well melted before adding the wax and tallow. If this be not done, the grafting wax will be full of lumps. When melted pour it into cold water, and work it by hand into rolls of convenient size. In cold weather, soften the wax by putting it into warm water before using. When the scions are set—say as many as 20 or 30, or few as is wished—have the mixture ready and apply it warm, with a small wooden paddle. See that every part is covered and the air completely excluded. It requires no bandage.

GRAFTING WAX, Liquid.—Mr. L'Homme-Lefort invented, not many years ago, a grafting composition, which, when generally known, will no doubt supersede all others now in use, either for grafting purposes or for covering the wounds of trees. It is very cheap, very easily prepared, and keeps, corked up in a bottle with a tolerable wide mouth, at least six months unaltered. It is laid on in as thin a coat as possible, by means of a flat piece of wood. Within a few days it will be as hard as a stone. In addition to all the advantages indicated above, it is not in the least affected by the severe cold of our winters; it never softens or cracks when exposed to atmospheric action or changes. There is no better preparation for covering the wounds of trees. As long as the inventor kept it a secret it was sold at a very high price, and even now it is generally unknown. The recipe is as follows: Melt 1 lb. of common resin over a gentle fire. Add to it 1 oz. of beef tallow, and stir it well. Take it from the fire, let it cool down a little, and then mix with it a tablespoonful of spirits of turpentine, and after that about 7 oz. of very strong alcohol (95 per cent.) to be had at any druggist's store. The alcohol cools it down

so rapidly that it will be necessary to put it once more on the fire, stirring it constantly. Still the utmost care must be exercised to prevent the alcohol from getting inflamed. To avoid it, the best way is to remove the vessel from the fire, when the lumps that may have been formed commence melting again. This must be continued till the whole is a homogeneous mass similar to honey.

GRAFTING, INDIA RUBBER.—Some of the English gardeners have successfully used strips of India rubber in the place of grafting wax, being neater, more perfect, and not soiling the fingers. Sheets are purchased in market for sixpence per square foot. They are about as thick as brown paper. They are obtained of the manufacturers of this article before it is applied to muslin and other surfaces. The strips cut from it are about an inch long and an eighth of an inch wide, for small grafting; the pieces will stretch two or three times their first length; the ends adhere when pressed firmly with the thumb nail, the sheet having been previously washed and wiped dry.

GRAFTING.—In grafting, a sharp penknife and a good fine saw are indispensable. Splitting the stalk so that the bark shall not be at all bruised, and shaping the scion wedge-fashion both ways, preserving also the bark uninjured, and placing the rim of the wood of both stock and scion exactly together, so that the sap can intermingle—there is no danger of failure if they are properly waxed. One year's wood should always be used when it can be obtained, as it is more certain to take and grows more vigorously. For grafting generally, any time is good when growth is going on, and there is not too much sap in the scion; the amount in the stock makes no difference. If there is much in the scion, it is liable to rot before the union takes place. If scions are taken from healthy trees, and are kept from drying, sprouting, or other injuries, grafting may go on from early in the spring till mid-summer.

GRAFTING (ROOT) APPLE TREES.—This kind of grafting is performed as follows: Take seedling stocks one or two years old, cut off the stock at the collar of the plant, and remove the top root and all unnecessary fibrous roots, leaving only a few of them four or five inches long. Wash the stocks, and make a very smooth cut sloping upward an inch or so across the collar. In the center of this cut make a slit or tongue to receive the scion. The scion, three or four inches long, should be made to fit the tongue exactly, both the woody part and the inner bark. On this close fitting depends the success of the operation. This done, cover the entire graft with the wax, or with prepared wax cloth, which is nothing more than cotton cloth spread thinly with grafting composition while it is hot. This work is commonly done in the leisure of winter. After the required number of stocks have been grafted, they are packed away in sand in a cool cellar to be planted in the spring.

GRAFTING GRAPES.—Grafting grape vines may be done early in the spring, before the sap begins to flow, or after the vines have leaved out partially, and just after the main flow of sap is over; or it may be done in the fall, but in all cases it is to be done on the stock so low down that the scions may be covered with earth

up to their buds. Attention to this point is necessary to success.

The operation is similar to grafting fruit trees—the scions should each have a single bud, and they should be cut off an inch above, and not less than three inches below the buds. The grape stocks are to be split, and the scions made with long, wedge-shaped ends, with shoulders, just as apple or other fruit-tree grafts are made, and with the inner sides of the wedges narrowest, so that the pressure will be greatest where the inner bark of vine and scion meet. These stocks are then bound with basswood bark, and grafting wax applied, and the soil packed firmly around the scions, leaving the buds just above the ground.

When the grafting is done in the fall—and we think that the best season to do it—a flower pot should be inverted over such stock and grafts, (insert two scions to each stock,) and covered with straw or barnyard litter to prevent freezing—and in the following spring the earth may be packed around the stocks as above. It is thought by those who graft in the fall that the stocks and scions have more time to unite, and form a complete junction during the winter, and will grow sooner than when grafted in the spring.

When grape vines are cut off when the sap is flowing freely, for the purpose of grafting them, they will be liable to “bleed” to death—that is, the sap will escape to such a degree that the vitality of the roots will be destroyed, consequently, all grafting in the spring should be done before the sap begins to flow, or after the flow of sap is over, early in June, in the climate of New York.

If vines are to be grafted above the ground, they should be bent over and covered with earth where the junction takes place, and a mulch of grass, or otherwise, put upon them, to cause them to continue moist. It is a rather difficult operation to graft grape vines three, four or more feet from the ground; yet we think it can be done, and a dozen varieties of grapes made to grow on one vine.

GRAPES.—The best soil for the vine is a light, dry loam, with a slight intermixture of clay and calcareous matter, moderately rich, the soil inclining a little to the south. This should be plowed in the fall of the year, at least one foot deep, and trench plowing would be better, making one plow follow directly after another in the same furrow, turning up the ground, if possible, 15 or 18 inches deep. The utility of this is, to give a light, deep surface for the roots to strike into the earth, and thus draw the more nourishment from it, and be sufficiently low and out of the way of being cut off, when the plow is run between the rows for after-cultivation. **Planting and Culture.**—Early in the spring, before vegetation commences, replot and harrow the land fine, strike off the rows 6 feet apart, then take cuttings or roots, as they can be best obtained, and plant them 3 feet from each other in the rows. As the vines grow they will require staking and tying up with the stalks of long, tough grass, or green, flexible straw. The after cultivation is precisely like that of corn or any root crop, it being necessary merely to plow out between the rows occasionally, and keep weeds down by hoeing the ground about the vines, where it may be slightly elevated from the centre of the rows, in order to keep them from any

standing water. Two vines only are left from each main stem of a different year's growth, the rationale of which may be thus simply defined: The branch that grew, for instance, in the season of '80, bears in '81, and in the spring of '82 it is pruned off, and that season another grows in its place, prepared to bear in '83, while that which grew in '81 bears in '82, and is cut off in '83, and the one growing in '82, when the last gave fruit, will bear in '83.

GRUBS, (White,) Remedies for.—An authority says: A good coat of unrotted manure, plowed in six or eight inches deep, is almost a specific against white grubs in corn or potatoes. We suppose the grubs work in the manure and leave the corn plants alone. Plowing under clover, immediately before planting, often has the same effect.

GOOSEBERRY BUSHES. Mildew on.—A weak solution of saleratus, pretty strongly tintured with alum, sprinkled over gooseberry bushes, is sure to prevent mildew.

HAY, Cutting and Curing.—1. Get ready for haying—that is, put your mowing machine, etc., in good order, so as to have no delay when you begin the work.

2. If you have a good deal of grass to cut, some of it should be cut a few days before it is actually mature, or you will be compelled to cut other fields so much later than it ought to be cut, that you would lose more by waiting till your earliest grass is fully ripe, than you would gain by waiting till it is mature; besides grass cut a few days before it is strictly ready for the mower makes excellent hay, but not quite so much of it as when cut later.

3. When the time comes to commence mowing—which should be when there is a prospect of fair weather, go ahead and do not wait until the dew is off, on account of any injury the hay may sustain, as you will never be able to see any difference in value between hay, from grass cut with or without the dews upon it.

4. Just as soon as the sun has dried the upper surface of the grass, the spreading operation may commence; and you should have help enough to do the work well. No grass cut during the previous afternoon, and up to 10 o'clock that day, should remain unspread at dinner-time, unless it be such as is light, and is left in good shape to dry by the machine, as is often the case. Keep the grass moving as long as possible before you begin to protect it for the night; and here we will say that we never would allow a load of hay to be put into our barns that was cut the same day, except when the grass had been delayed to be cut till it was past its prime and partially dry, so that a few hours of sun and wind sufficed to cure it.

5. After drying the hay as much as possible up to 3 or 4 o'clock, P. M., according to the quantity of it, and hands to take care of it, the question comes up: Is it best to cock it, or to rake it into windrows, and so leave it till the succeeding day, when, if the weather be fair, it may be put into the barn or stack? If left in windrows a great deal of labor is saved, and if the next day is fair, the hay is in a better condition to be spread than if in cocks; but if a storm ensues, the hay is in a bad shape, and will suffer injury, according to the length of unfair weather that takes place. No farmer should leave his hay over night in windrows, unless he shall

have the very best of reasons for believing that the next day will be fair.

6. Hay may be injured by drying too much; but the wide awake farmer will avoid that, and either get his hay into windrows or cocks before it is thus damaged.

HAY, (CLOVER,) Management of.—Clover should be mowed as soon as it is well in blossom. There is no necessity to wait for a brown head; there will be plenty to be seen before the crop is well down. Cut when the dew is off, and allow to dry until the afternoon, when it should be shaken up and turned before the dew falls. If a tedder is employed, its constant use will fit the clover to be put in cocks the same day. If turned by hand, it may lie until the noon of next day, when it may be put in cocks, made as high and narrow as possible; they will shed rain better in this shape, and, if caps are to be used, a yard square will be sufficiently large to cover them. Caps are to be strongly recommended, and the above size is sufficient, as the top only needs protection. Put up, and thus protected, the hay may stay in the field until it is all made, when it may be hauled together. If anycock should be damp inside, spread for a few minutes; it will dry rapidly. Clover cured in the cock is much more valuable than that dried in the sun, and wastes less in hauling. Put away the first cut hay by itself, in a place convenient for use in the spring. Cows coming in early in the spring will thrive on this hay; the milk will be largely increased in quantity, and be richer in quality, while the butter will come easily, be free from white curdy specks, and in color will not be far behind that made from June grass.

HAY STACKS, To Ventilate.—Stacks of hay, corn-stalks, etc., may be ventilated by making a hole perpendicularly through the centre, with apertures through the base and top or sides of the stack to admit a current of air. The orifice should be constructed when the stack is being built, which can easily be done by filling a bag of the requisite size with hay or straw, placing it upright in the centre of the stack, drawing it upward according as the stack rises. In this way a chimney will be formed in the centre of the stack, which will carry off the steam, if the hay or corn-stalk should ferment, and by admitting air will prevent damage from mold. The top of the air-tunnel should be protected by a roof to keep out rain.

HEDGES, How to Plant.—A good way of planting hedges is to plow the ground about 12 or 15 inches deep, and pulverize completely; then set stakes in range as the hedge is to stand. Then take a common garden hoe and dig a hole as deep as the plants are to be set, standing with the face in range with the stakes; then put a plant down with the top toward you, leaving at an angle of about 45 degrees, being careful to put it a little deeper than it grew in the nursery; then cover that one up by digging the dirt out for the next plant, and so on, standing in the range of the stakes. It will facilitate the job by having a dropper to put the plants in their places as you need them.

HEDGE, BARBERRY.—After obtaining good seed, mix it with moist earth, and keep it in a cool cellar, free from frost, until the spring opens. Then sow it in drills, like carrot seed. Thin out the plants to six inches apart, and keep

the rows free from weeds. The following spring they will be ready to transplant. Set them out by a line, six inches apart in the row.

HEDGE, CEDAR, (For Cold Latitudes.)—First dig a ditch about 1 foot deep by 2 feet wide where the hedge is to be, then go and cut down second growth cedars, (out of thick clumps or clusters are best, they having most all their branches on one side,) about 3 or 4 inches through at the butt; take branches and all and lay them in the ditch, with the thickest branches up; turn up the branches so they are—that is, the branches—not more than 8 inches apart, and if there are not enough on 1 tree, lay down 2, side by side, butt and top together; then chop off all branches that cannot be got to lay in the ditch to about 10 inches long or so, so that they will cover up; then cover up, taking a little pains to stake and bend the branches that are to form the hedge into a straight row, or nearly so; then cover about two-thirds up, and then water and finish covering, and with a very little trouble the hedge in 5 years will be so thick that a hen cannot get through it, or sheep or cattle get over it, and will get stronger and larger every year. Where small second growth cedars cannot be got, small trees will answer nearly as well—or even sow the seeds, which is a rather slow process, but sure.

HEMP CULTURE.—The land should be thoroughly pulverized with plow and harrow. The seed-bed cannot be put in too fine tilth. Fifty to seventy-five pounds of seed per acre should be sown evenly broadcast. The amount should depend upon the strength of the land; the stronger or richer the soil the more seed may be sown, the object being to secure all the plants the land will develop, and thereby a fine and a long fibre. The seed should be covered with a light harrow, running it both ways. The sowing should commence as soon as the ground is dry and warm enough to put into proper condition to receive the seed. There is no after-culture.

HORSE-RADISH.—For the cultivation of this vegetable the soil should be deep and moist. Cut off slips from a root with a little of the crown and plant 3 or 4 inches deep in rows, it for field culture, so as to admit of handy working. If in a garden it matters little whether in rows or not, as it soon sprouts up in every direction. Unless the whole crop is removed the bed will supply itself year after year, and a plot 10 feet square will be enough for an ordinary family.

HOTBED, To Make a.—Make a frame 6 feet long by 4 feet wide; let the one end be 2 feet in height, and the other end 1 foot. Along the top of the long sides, about an inch from the upper edges, nail 2 cleats. This frame may be made of one inch boards. Glaze the sash and fit it upon these cleats, thus forming an inclined plane, which, when the bed is completed and the frame permanently arranged, should be made to face the south-east. In this manner the rays of the morning and noonday sun fall directly upon the growing plants.

To make the bed, draw well-rotted horse-manure and pile it in a square heap, about 3 feet deep, and of sufficient dimensions to admit of the frame being placed securely upon the top. Within the frame, cover the manure heap with about 6 inches of rich earth. Put on your sash

and leave it until the fermentation of the heap causes the earth to become warm. When this is effected, large dewdrops will form upon the inside of the glass. If the fermentation is not very active, cover the sash with boards, so as to prevent all radiation of heat from the pile. The frame may be kept still warmer by banking up the outside to the top with manure.

When the earth has become thoroughly heated the bed is ready for sowing. To sow with the finger, draw drills about half an inch deep, take the seed of cabbages, cauliflowers, tomatoes, peppers, etc., between the forefinger and thumb, and by rubbing the two gently and moving the hand along the drill, the seed may be sown evenly and thickly.

The great principle in the successful forcing of plants in a hotbed is to subject them to a sufficient amount of heat without allowing them to burn. This can only be regulated by experience and judgment. If, however, the weather be very warm, by throwing open the sash during the day and closing it at night, the plants may be brought in contact with external air, and will become more hardy and better able to bear the chilling effects of transplanting into the open air.

A constant succession of early plants may in this manner be forced, and after their removal melons and cucumbers may be planted in their places in small sods, and, when sufficiently forced, may be removed without being at all disturbed.

HYACINTH CULTURE.—The hyacinth requires a light but rich soil, sandy loam, well dressed, and mixed with thoroughly rotted manure, but if the soil is not sandy, add a third of silver sand. The soil for a hyacinth bed must be deeply dug, well mixed and turned over. Plant the bulbs eight inches apart, and four inches under the soil. *To Grow Hyacinths in Pots.*—Select the bulbs, and plant each one separately in a four-inch pot, well drained with potsherds, and filled within an inch of the top with the same soil recommended for the beds. If the plants are to remain outdoors until rooted, place them in a dry level place, and cover them about six inches deep with straw, decayed leaves, or cocoanut fibre, putting a piece of bass mat over to keep off rain; they will not require watering. In ten weeks they will have made sufficient roots, and may be brought into the house and watched carefully. If brought into the house directly they are potted, keep them in a dark, moist atmosphere for about ten weeks, then gradually expose them to the light, and give them water frequently. *To Grow Hyacinths in Glasses.*—Single flowering hyacinths are the best for this purpose. Fill the glasses with soft water, (rain water is the best,) so as nearly to touch the bulb. Exclude the light totally from them for five weeks, by which time the glass ought to be full of roots; they may then be placed where they will have plenty of light and an equable temperature. Do not change the water while they are in the dark, but when exposed to the light pour out half the water in each glass once a week, and fill it up with fresh water, which should have been kept for some time in the same room, that the temperature may be the same. A very little guano, mixed with the water, strengthens the plant.

IMPLEMENTS, (Farm,) Care of.—It is a

lamentable fact that a large majority of our farmers lose as much from a want of proper care of tools as from the actual wear and tear of them. Repeated wetting and drying injures, sooner or later, any kind of wood-work; the moisture getting into the cracks soon begins the work of decay. This may be prevented by the timely and occasional application of some cheap paint. The shovels, spades, and forks are brought into the tool-house with the dirt sticking to them, and in that condition they remain through the winter, or until they are again needed. All practical farmers know how much better a bright plow turns the furrow, how much easier it is on the team and driver, and yet they will bring their plows and harrows in every fall with the dirt sticking to them, and allow them to remain in that condition until again wanted, much to their irreparable injury, and also to their own loss and expense. There are various mixtures which might be applied to the iron to prevent rusting, the cheapest of which is common (unsalted) grease. A better article may be formed by the melting together of six pounds of fresh (not salted) lard and two of resin. An old iron pot is a good thing to keep and compound the mixture in. As soon as a tool is done being used for the season, clean it off and give it a coat of this mixture, and even if it remains undisturbed for years it will come out as bright as when put away. Implements properly cared for will not only last twice as long as where this is not the case, but, as we said before, they are far better in every way.

INSECTS, To Exterminate.—By scattering chloride of lime on a plank in a stable, biting fleas are driven away. Sprinkling beds of vegetables with a weak solution of this salt effectually preserves them from caterpillars, slugs, etc. It has the same effect when sprinkled on fruit trees or shrubbery. Mixed in a paste with fatty matter, and applied in a narrow band around the trees, it prevents insects from creeping up. Another plan is to carry all the toads you may find to your gardens. They will devour immense numbers of bugs. A toad will swallow the largest specimen of the tomato worm, though sometimes he will have a hard time of it. Hens and wasps and spiders are all devourers of your enemies. A common duck will go up and down rows of tomato and potato vines, and pick off the large worms usually found on such vines, as fast as it can see them; and they will see a half dozen when a man would not see one. Young turkeys will do the same service, though they are not so easily controlled and guided. All fallen fruit is to be picked up twice a day—at any rate, one time—boiled, and then given to your cattle to be devoured. By doing this it will pay ten times over, and the result of it will be that the next year you will not have insects. See also the recipes for a like purpose in this department.

LAWNS, KEEPING.—Lawns must be kept rich, if you would have a good, fresh, green carpet of grass. Mowing them repeatedly year after year, and raking off the fallen leaves that drop from the trees, which neatness demands, and which thus removes a useful top dressing, requires an occasional addition of manure. By far the best time to apply this manure is late in autumn. If spread earlier it defaces the lawn at a time when it proves offensive. Fine, dry ma-

nure, which may be readily pulverized, is best, as it spreads evenly and neatly over the surface. But where this can not be had, coarse or lumpy manure will answer a good purpose if treated in the following manner: Spread it as evenly as may be convenient, and if there happens to be a sharp November freeze, followed by thaw, it will loosen the lumps and render them quite friable. Then immediately run a smoothing harrow over the ground, and it will grind these lumps to powder and spread them over the grass in better style than can be done by a skillful hand, and with great rapidity.

LETTUCE IN WINTER.—It is said that heads of lettuce can be produced in winter in from 24 to 48 hours, by taking a box filled with rich earth, in which one-third part of slaked lime has been mixed, and watering the earth with lukewarm water; then taking seed which had been previously softened by soaking in strong brandy for twenty-four hours, and sowing in the usual way. We are assured, but will not vouch for the fact, that a good-sized head of lettuce may be obtained in the time mentioned.

MANURES.—There are two important requisites to the luxuriant and healthy growth of plants—plenty of nutriment, and a suitable place for growth. There are soils, it is true, so rich in the elements of plant-food, and so bountifully supplied with those partially decayed remains of vegetable growth which we call humus, that decades of continued cropping do not suffice to exhaust their supply of the one, nor to rob them of the mellowness imparted by the other. Unfortunately, however, but little of the earth's surface is of this character, and the question: "How much and what sort of fertilizers shall we use?" is a very weighty one.

MANURES, STABLE.—Careful experiments by German agriculturists have demonstrated that the plant requires a certain list of substances for its nourishment, its food, such as nitrogen, carbon, potash, lime, soda, iron, phosphoric acid, sulphuric acid, and that as far as its nourishment alone is concerned, it is a matter of total indifference to the plant whether these are applied in the form of stall manure or of guanoes, superphosphates; the one and the only requisite being that these substances be present in the soil in sufficient quantity and in an assimilable form. Farmers followed the teachings of science in supplying food to plants in the form of artificial rather than natural fertilizers. Science had told them that the nitrogen and phosphoric acid of the one were just as nutritious as those of the other. But this was not all that science had to say. The use of a part of its teaching, and not the whole, was the mistake. The reason of the failure here is clear. Science informs us that the plant, like the animal, requires not only good and sufficient food, but also an appropriate place to grow in—or, in other words, that the physical character of the soil, its condition as regards warmth, moisture, compactness, or looseness, are just as important as its chemical contents, or the supply of nutritive elements it furnishes to the plant.

And it is precisely here that the superiority of stable manure appears. Not only is it a complete manure, furnishing all the elements of plant food, as special fertilizers do not, but it contains also a large amount of organic matter, undigested portions of the food of the animal,

and straw used for bedding, and the like. This organic matter decays in the ground, and by its decay warms the soil, loosens it if it be compact, and aids in binding it together if it be too loose, and assists in the working over of the mineral matter contained therein into a condition fit for the use of the plant.

The general rule to be deduced from the above facts would be, if tersely expressed, keep stock upon the farm to produce such an amount of stall manure as will be sufficient to keep the soil in good physical condition, and rely on artificial fertilizers only to supply the still remaining deficiencies of plant nourishment.

MANURE HEAP, Management of.—Every manure heap consists of three portions, and all of these require very different means for their preservation. We have first the carbonaceous matter. This forms the chief bulk of every manure heap, and from the fact that it came originally from the atmosphere, and that it can be replaced from the same source, theorists who have not carefully watched the results attained in the practice, are apt to depreciate its value. It is not as valuable as the other two constituents, but it serves to bring the land into fine, friable, mellow condition, and it is by no means certain that the carbonic acid, furnished by its decomposition, is not a source of plant-food. Under any circumstances, however, it is well to be economical of it, and allow none to go to waste.

The second portion is the inorganic plant-food of animals. It consists of phosphoric acid, lime, potash, soda, magnesia, soluble silica, etc., and the great source of loss of these constituents is from their being washed out. They cannot evaporate, but if the rain and liquid manure are allowed to fall on a manure heap, and drain through it and out of it, the manure pile becomes a mere *caput mortuum*—a worthless residuum of originally valuable materials. Hence every barnyard where manure is kept exposed to the weather, should be hollowed out in the centre and well puddled, so as to prevent the soluble matters from draining or soaking away. Moreover, if the farm is located in a region where a great deal of rain falls, it is necessary to place a large portion of the barnyard under the cover of sheds, which prevent excessive wetting. Some moisture is absolutely necessary. Too much is decidedly injurious.

The third constituent of the manure heap is nitrogen. This is a substance of great and undoubted value, and every care should be taken to preserve and increase it. When vegetable substances containing nitrogen undergo putrefaction, in a moist state, the nitrogen in general becomes converted into ammonia. The same process of putrefaction, however, produces carbonic acid in large quantities, and this combines with the ammonia to form carbonate of ammonia. This salt is comparatively volatile, and if the manure is allowed to dry up, while exposed, to thin layers, the ammonia disappears. Several agents may be set to work to fix and retain it.

Water is one of these—carbonate of ammonia dissolves very readily in water, and does not then evaporate to the same extent that it would do from a dry mass.

The great agent in the fixing of ammonia on the manure heap is the humic and similar acids produced during the decomposition of the straw.

These acids do it very effectually, and hence the importance of mixing animal excrement with a large proportion of moist straw.

One of the most powerful fixers of ammonia is plaster or sulphate of lime. When this meets carbonate of ammonia in solution, decomposition ensues. Carbonate of lime and sulphate of ammonia are formed, and as sulphate of ammonia is not volatile at ordinary temperatures, there is no danger of loss except by its being washed out.

Hence a few simple rules will enable us to manage a manure heap so as to avoid any very great loss:

1. Prevent all loss by drainage and soaking.
2. See that the animal excrements are covered with moist straw.
3. See that, while too much water is avoided, there is a sufficiency to keep the manure moist.
4. Moisture and packing prevent fire fanging—that is, too-rapid fermentation.
5. If you find it convenient to use a few bushels of plaster, sprinkle them over the heap so that the plaster will be incorporated with the successive layers. It will thus prove of great service.

MANURE, APPLYING.—In spreading manure, care should be taken to scatter it evenly over the land, breaking to pieces all large and hard lumps. This should always be done immediately, or not more than half a day, before plowing, especially if the weather is dry and very windy. The manure should be plowed under, before it dries very much, or loss will accrue. Another way is to plow the land first, and then put the manure on and harrow it in, if put on plowed land; if on meadow, spread on in early spring on the latest seeded piece. That ground is mellow, and when it rains it carries the manure down around the young roots, and the result is a heavy crop of grass.

MANURE, Converting Dead Animals into.—The conversion of the entire bodies of dead animals into manure, can be done by subjecting them to the action of dilute hydrochloric acid, by means of which they are completely dissolved, and converted into a uniform pulp, which is inodorous and can be kept for any length of time, to be applied when needed towards fertilizing the soil. Another method is to cut them up, and compost the dead meat with dry swamp muck or peat. The ammonia and phosphate will all pass into the peat, making a rich pile of compost, and that without smell.

MANURE, Converting Bones into.—Take one hundred pounds of bones, broken into as small fragments as possible; pack them in a tight cask or box with one hundred pounds of good wood ashes. Mix with the ashes, before packing, twenty-five pounds of slaked lime and twelve pounds of sal soda, powdered fine. It will require about twenty gallons of water to saturate the mass, and more may and should be added from time to time to maintain moisture. In two or three weeks, it is asserted, the bones will be broken down completely, and the whole may be turned out upon a floor and mixed with two bushels of dry peat or good soil, and, after drying, it is fit for use. It has been recommended to pour on to this mass dilute sulphuric acid to aid decomposition and prevent the escape of ammonia.

Another method is to take a kettle holding a

barrel or more; fill with bones; pour caustic ley over to cover them. A gentle fire is built for two or three successive days, to barely warm the liquid through. In a week the bones will become softened. Mix the mass with three loads of muck, afterward adding the leached ashes, from which the ley was obtained. Let the whole remain, in order to decompose the muck, and apply.

MANURE, Garden Refuse as.—Green stuff, such as cabbage leaves, radish and beet tops, and the like, should not be allowed to dry. Let them go while fresh to the pig-pen or to the compost heap. Young weeds—and old ones ought not to be found in the garden—should have the same destination. By saving all the refuse of the garden in a heap by itself, or putting it in the pig-pen, a surprising accumulation of valuable compost will be found at the end of the season.

MANURE, HEN.—A mixture of hen-dung, unleached wood-ashes and plaster, frequently has a wonderful effect on corn. If the ashes and the hen-manure are perfectly dry, no decomposition or chemical change will take place when they are mixed together. But if moist, more or less ammonia will escape, and the plaster will not hold it. The only advantage of mixing these articles together, aside from the ease of applying them, is probably this: When the dry hen-manure is thoroughly broken up fine, and mixed with the ashes and plaster, and applied in the hill, the moist soil soon induces chemical action. This produces more or less heat immediately under the seed and favors germination; carbonate of ammonia would also be given off, and would be absorbed by the soil immediately in contact with the roots of the young corn plants, and would, if everything is favorable, cause them to grow rapidly and assume a dark-green color. But care must be used in applying the mixture, or it may do more harm than good by burning the roots. It should be well mixed with the soil, and not come in direct contact with the seed. Some persons apply it on the hill after the plants are up, just as they frequently apply the plaster or ashes alone.

MANURE, Leaves as.—Forest leaves are excellent to supply the stable-yards, and, where straw is scarce, also the cow-stables and hog-pens. They can be most conveniently gathered after the first snow, or at least before the wintry blasts have scattered them. They then lay compactly, and, being moist, can be handled with greater facility. Leaves absorb large quantities of liquid manure, and are an excellent fertilizer in spring. They can be gathered, too, when other labor about the farm is slack.

MANURE, LIQUID.—In every 100 lbs. of cow's urine there are 60 lbs. of water, 5 lbs. of urea, 5 lbs. of phosphate of lime, 12 lbs. of sal ammoniac and muriate of potash, and 10 lbs. of carbonate of potash and ammonia. While the solid excrements obtained from one cow are estimated to manure three times the amount. Our dairy farmers will see, therefore, how important it is to have tanks connected with their stables in which to deposit this material, or a good supply of sawdust, dry earth, or muck, for absorbing it in the gutters of the stable. A careful and accurate farmer in Scotland has found that while 14 head of cattle would make 6 loads of solid manure, the liquid would saturate 7 loads of

loam, rendering it of equal value. He had repeated the experiment for 10 years, and found the saturated earth fully equal to the best putrescent manure.

MANURE, NIGHT-SOIL.—There is no better manure than night soil. It should be mixed thoroughly with three or four times its bulk of muck or charcoal dust, or in the absence of either, good loam or coal ashes will answer. Mixed with some such absorbent, it will have lost its offensive odor, and become as portable as any manure. If it is to be used to assist garden crops, apply after spading or plowing the land in the spring, and mix it thoroughly with the surface soil; if to corn, apply in the hill before planting; cover the manure with soil before you drop the soil on it.

MANURE, Sawdust and Chip.—These are excellent articles for promoting the growth of the vines, shrubs and small plants. They must be thrown into a pile, after removing the coarser portions of the mass, and thoroughly saturated once or twice a week with a mixture of urine and soapsuds. This will induce incipient fermentation, and so far break down the texture of the mass as to prepare it to act with energy when applied to any soil or crop.

MAPLE TREES, To Tap.—Much injury is often ignorantly and thoughtlessly inflicted on sugar maple trees by excessive tapping, and various negligent practices in connection with the operation. As a guard against such malpractice the following rules will be useful: 1. Use nothing larger than a three-fourth inch auger or bit. One-half to five-eighths of an inch is best. 2. Do not open the trees until they will run equally well on all sides. 3. Select the thriftiest part of the tree that is farthest from an old orifice. 4. Never put more than one spout to a tree that is less than one foot in diameter, nor more than one bucket to one less than 18 inches in diameter. 5. Never bore trees more than once in a season, but freshen them once, or any time after a long and hard freeze. 6. Never leave spouts in the trees a single day after they have done running. The quicker the orifices dry, the less they decay.

The following facts should also be remembered: The root of a tree will sometimes run more than the body. A healthy tree runs in proportion to the size of its top, and should be opened with respect to its capacity for production. Trees in open grounds, with spreading tops, discharge more and much sweeter water than those in a forest.

MAPLE SUGAR, MAKING.—*Preserving the Trees.*—If the trees are worth having they are worth keeping, and it is bad political economy, and a very immoral waste, to spoil that which will enable posterity to live. Consequently, do not tap the tree with a huge gash, but smooth off the outside bark about the size of a man's hand. At the bottom of this, with a three quarter of an inch auger, bore from half to three quarters of an inch into the wood, but not deeper. Cut a V into the wood above the auger hole, with a mallet and firmer chisel, to communicate with the auger hole. *Spouts.*—Tin spouts are the handiest. They save time in making and adapting to the purpose. You will waste time in making elder spouts, or wooden spouts of any kind. *Vessels.*—Unpainted pails are the best, and if they are well scalded before being used

they are all the better. *Furnace*.—Instead of the old plan of a kettle hanging over a fire, build a furnace, over which you can place shallow pans for evaporating the sap. In many places maple sugar making is abandoned on account of the waste of fuel; but in the way last recommended the fuel is saved very much, and what, under the old system, was a losing operation in farming, may become moderately profitable. If you will use a kettle, a built-up furnace, over which the kettle may stand or hang, is still a great economizer of fuel. *Boiling Down*.—If you have two or more pans, or kettles, you will save time, for while one is evaporating, the other may be poured off through a straining cloth, previous to sugaring off. *Pouring Off*.—When the syrup has become nearly as thick as ordinary New Orleans molasses, strain through a flannel into a pan or kettle, which place again over the fire. When warm, you can add half a pint of milk, or an egg beaten in the same quantity of water, as a clarifier, if it needs it. If everything has been carefully handled this will not be necessary. *Sugaring Off*.—While the thick syrup is boiling take off the scum. Keep the fire regular and steady. While this is going on, try several times a drop of the boiling syrup on a bright ax blade; when a drop thus cooled slides off with ease, leaving no trace, take the kettle from the fire, and stir it till it begins to form fine grains, when pour it into moulds of any desired shape. Moulds with sheet iron or zinc bottoms, and wooden sides and subdivisions, are handy and clean. *Strained Sugar*.—By boiling somewhat less, and placing the sugar (after it is cooled and granulated) in vessels with false bottoms, perforated, much molasses drains off, and a finer article of sugar is produced. During the draining the sugar should be kept moderately warm, say at about 70° Fahrenheit. *Clarifying*.—Where the sap has been kept entirely free from dust, twigs, leaves, etc., the milk or the egg is unnecessary. *Souring*.—The tendency to ferment and turn sour may be prevented by a little quicklime added to the sap. *Draining*.—The forms of the sugar should not be drained until all the sugar possible has been granulated. To secure this, turn them upside down soon after taking them out of the moulds; after a little while turn them back again, and so on for three or four hours, after which, with a vessel under them to catch the molasses, they may be left to drain thoroughly. *A Large Sugar*.—If you have many trees, and wish to make a considerable business of the maple sugar-making, build a good furnace of brick or stone, with one deep evaporating pan, and several shallow ones, and arrange a barrel or hogshead of strained sap, so that it will supply the deep pan with a constant stream of sap, from which it may be ladled into the thin ones as needed.

MEADOWS, Worn Out.—There is no more profitable field belonging to the farm than a good meadow, and yet comparatively few farmers understand the art of keeping them in a productive state. Meadows become worn out, and consequently unprofitable, from two causes—namely, from want of proper manures, or from a kind of mess which farmers usually call fog. The first is easily remedied by spreading a light coat of chaff of any kind over the sod, any time between November and the middle of April, as this is not only the best manure for meadows, but must

not be put on farm lands at any time, as it contains a great quantity of the seeds of noxious plants that greatly thin, and sometimes almost destroy the grain crop. The second is effectually and permanently destroyed and converted into a highly nutritious manure by a top-dressing of lime, say twenty bushels to the acre.

MELONS.—First give the ground a good coat of fine manure, thoroughly dig or plow the ground, and then level with a rake or otherwise. Then make a marker, by taking any piece of wood that will not bend, eight feet long; fasten two pegs to this, seven feet apart, and nail a handle in the centre, bracing it both ways; then draw a tight line for the first mark, drawing the marker the first time through with one peg against the line; the next time through, but one peg run in the last mark; then you get all perfectly straight. Mark across these in the same manner, and then place on each corner or hill two shovelfuls of well rotted manure; take the digging fork and mix with the soil thoroughly to the depth of the fork tines. After this take the rake and rake the soil on the top of this to the depth of three inches, which makes the hill a little higher than the surface of the ground.

The seed should not be planted until the ground gets thoroughly warm—say the last of May or first of June in this section. Too early planting is one cause of failure. Then stick nine seeds in each hill. As soon as they come up, sprinkle a little plaster on the plants while the dew is on, to keep the bugs off; do this as often as the plaster gets off, until the plants get to be of good size, and then thin out to four plants in a hill. When these begin to run nicely, pinch off the tip end of the runners, which will cause them to throw out side runners; pinch these in the same manner; keep the ground well cultivated and free from weeds till the vines take possession. If treated in this manner they will cover the ground completely, and you will have, from a small patch, watermelons by the hundred, while others, pursuing a different course, will frequently lose all their plants by the dry weather, because they had a manure pile underneath the plants.

Some persons raise Mountain Sweets altogether, which is supposed to be the sweetest melon grown.

MELONS AND CUCUMBERS, Barrel Culture for.—The plan recommended is to take a tight barrel or cask, remove one head, and partially fill the barrel or cask with large pebbles or stones—say half full; upon these stones place a mixture of compost with rich alluvial soil, or fine, fresh vegetable mold, until the barrel or cask is filled to within three or four inches of the top, and in this plant the seed and cover to the requisite depth. This barrel or cask may be set in any convenient situation where sufficient room or space can be obtained, and around which arrange lattice work or brush to sustain the out-spreading plants, in whatever manner may be found most convenient for affording access at all times to both the barrel and the plants.

Upon the outer side of the cask insert a pipe of convenient size, through which water may be introduced to the lower or under half of the barrel daily, or as often as occasion may require; this portion of the cask should be kept constantly filled with water. Midway of the cask the staves should be perforated with several half

inch holes, for the free escape of any surplus water, and at the same time to permit the admission of an equal distribution of air; the purpose would be better accomplished if the holes were bored upon a line at equal distances apart around the cask.

The effect of this arrangement, as will be very readily seen, is that, through the capillary attraction of the soil, sufficient moisture is absorbed at all times to nourish the plants, while the admission of air can be controlled at pleasure by opening or closing the apertures upon the sides of the cask.

As to the production of cucumbers alone under this plan, it has been found to greatly exceed any other; the yield, under proper management, from one "generating tub" has been found amply sufficient to fill a closely packed barrel with salted pickles.

MICE-GIRDED TREES, To Save.—Cut from the trees branches of green wood of the length required to connect the bark above and below the gnawed space, sharpen them at each end in the shape of a wedge, drive a narrow, sharp chisel into the bark above and below the space, and press each end of the shoots firmly into the cuts made by the chisel. Then wax the gnawed space well, or bandage it with fresh excrement from the cow stable. Pains must be taken to have the bark on the body of the tree and the bark of the branches driven therein coincide. Another method is to cover the damaged parts with clay, bound on with a bandage, done as soon as possible, as the death of the tree is caused by the seasoning of the sapwood.

MILDEW, Sulphur for.—The efficacy of sulphur in destroying and preventing mildew is now well known, and it is the chief reliance of the vine-grower, whether he cultivates under glass or in the open air. Where sulphuring is systematically followed, it is applied at least three times—just before the blossoming of the vines, after the fruit has set, and when it begins to color; and, beside these stated periods, it is applied whenever the appearance of mildew indicates that it is necessary. The mode of application, by La Vergne's bellows, is the popular way of applying the sulphur. The bellows may now be obtained at most implement stores. The character of the sulphur is of importance, as much of that found in commerce is liable to contain acid, and be injurious to the foliage. Sulphur contaminated by acid may be detected by the taste, but a more delicate test is litmus paper. This is paper stained with a blue dye, which turns red when it is touched by acids; it is kept by the druggists. The sulphur to be tested is mixed with a little water and the paper wetted with the liquid. If the least trace of the acid be present, it will be indicated by the change in color of the paper. Sometimes sulphur is not sublimed as above described, but the crude lumps are ground to powder in a mill. Sulphur thus prepared is free from acid.

MILK-ROOM, Charcoal in.—The fact that milk will absorb noxious gases to such an extent as to greatly impair its excellence as well as its healthfulness, is known to every dairyman. The power of absorption is not confined to the milk itself, but it extends to all the products that naturally form, or are artificially prepared from it, where they are cream, or butter and cheese.

The ill flavor, as well as the disagreeable odor, of much of our butter and cheese, are not imparted to them from substances that existed in the milk when it was drawn from the cow, but which were taken up while the milk was setting in pans or tanks, during the manufacture into butter and cheese, or while these products of the dairy are awaiting sale. How shall the air that enters our milk-room be purified? The answer is easily made—use charcoal. This common and inexpensive substance, when freshly prepared, is capable of taking up and securely holding ninety times its volume of ammonia, and a proportionate amount of other gases. Not only does it tightly hold the portions of noxious matter that pass through its meshes, but it also seems to have the property of attracting them from the surrounding air.

MILK, To Deodorize.—It frequently occurs in the spring, when the farmers are feeding the cows upon ruta-bagas, or turnips, that the milk becomes so strongly impregnated by their disagreeable taste and odor as to be unfit for butter-making. To obviate this, put a pinch of finely pulverized saltpetre into every gallon of cream. A little saltpetre worked into butter that has become sour, or rancid, will render it sweet and palatable.

MILK, (Richness of) To Test.—Procure any long glass vessel—a cologne bottle or long phial. Take a narrow strip of paper, just the length from the neck to the bottom of the phial, and mark it off with one hundred lines at equal distances; or, if more convenient, and to obtain greater exactness, into fifty lines, and count each as two, and paste it upon the phial, so as to divide its length into a hundred equal parts. Fill it to the highest mark with milk fresh from the cow, and allow it to stand in a perpendicular position for twenty-four hours. The number of spaces occupied by the cream will give you its exact per centage in the milk, without any guess work.

Now, if you wish to carry the experiment any further, and ascertain the per centage of butter, set the milk in a large dish, and collect say one hundred or two hundred ounces of cream; make your butter in the cream by ascertaining the number of ounces of butter you have made. Thus, if one hundred ounces of cream give five ounces of butter, you will know that one hundred ounces of milk will give five ounces of butter.

MILKING IN SILENCE.—A noted dairyman has said that no talking should be allowed while milking was going on. He had discharged a man because he would interrupt the milking by talking, and in three days the increase of the milk was equal to the man's weekly wages.

MILDEW ON ROSES, To Kill.—Mix equal parts, by weight, of powdered sulphur and quicklime. Moisten with water, and let the lime slake in contact with the sulphur. After the lime is slaked, place the whole in a kettle with plenty of water, and boil it until you get a saturated solution of the sulphuret of lime. This will be transparent and of an amber color, and should be drawn off and preserved in bottles for use. A gill of this added to a gallon of water, and applied with a syringe, will kill the mildew without injuring the roses.

MOTHS, (Coddling,) To Trap.—Take old cider, or cider vinegar, not very sharp; put half

a pint in some open vessel, and hang it in all parts of the orchard when in bloom—empty fruit jars, or tin oyster cans with the top all off would do. The string holding the vessel should be so placed that it would not turn the water running down the limb into the vinegar or cider. If you have a large crop to harvest, you will want to look to them every week or two to empty and renew if necessary.

MUSHROOM BEDS, Artificial.—Mushrooms may be grown in pots, boxes, or hampers. Each box may be three feet long, one and a half broad, and seven inches in depth. Let each box be half filled with horse-dung from the stables, (the fresher the better, and if wet to be dried for three or four days before it is put into the boxes; the dung is to be well beat down in the box. After the second or third day, if any heat has arisen amongst the dung, break each spawn brick into three parts as equally as possible, then lay the pieces about four inches apart upon the surface of the dung in the box; here they are to lie for six days, when it will probably be found that the side of the spawn next to the dung has begun to run in the dung below; then add one and a half inch more of fresh dung on the top of the spawn in the box, and beat it down as formerly. In the course of a fortnight, when you find that the spawn has run through the dung, the box will be ready to receive the mould on the top; this mould must be two and a half inches deep, well beat down, and the surface made quite even. In the space of five or six weeks the mushrooms will begin to come up. If then the mould seems dry, give a gentle watering with lukewarm water. The box will continue to produce from six weeks to two months, if duly attended to by giving a little water when dry, for they need neither light nor free air. If cut as button mushrooms, each box will yield from twenty-four to forty-eight pints, according to the season and other circumstances. They may be kept in dry, dark cellars, or any other places where the frost will not reach them; and by preparing, in succession of boxes, mushrooms may be had all the year through. They may be grown without the dung, and be of a finer flavor. Take a little straw, and lay it carefully in the bottom of the mushroom-box, about an inch thick, or rather more. Then take some of the spawn bricks and break them down—each brick into about ten pieces, and lay the fragments on the straw, as close to each other as they will lie. Cover them up with mould three and a half inches deep, and well pressed down. When the surface appears dry give a little tepid water, as directed for the last way of raising them; but this method needs about double the quantity of water that the former does, owing to having no moisture in the bottom, while the other has the dung. The mushrooms will begin to start in a month or five weeks—sometimes sooner, sometimes later, according to the heat of the place where the boxes are situated. The spawn bricks may be obtained from seedsmen, or be collected from meadows.

OATS.—Oats are chiefly sown after grass; sometimes upon land not rich enough for wheat, that has been previously summer-fallowed, or has carried turnips; often after barley, and very rarely after wheat, unless cross-cropping, from particular circumstances, becomes a necessary evil. One plowing is generally given to the

grass lands, usually in the month of January, so that the benefit of frost may be gained, and the land sufficiently mellowed for receiving the harrow. In some cases a spring furrow is given, when oats succeed wheat or barley, especially when grass seeds are to accompany the crop. The best oats, both in quantity and quality, are always those which succeed grass; indeed, no kind of grain seems better qualified by nature for foraging upon grass land than oats; as a full crop is usually obtained in the first instance, and the land left in good order for the succeeding crops.

ONIONS, Cultivation of.—The best soil for onions is a light, loamy, deep, mellow soil, and on a dry bottom. Select ground that has been well tilled and kept clean. If potatoes, turnips, or carrots have been carefully grown on it, it will be likely to be in good condition to prepare for onions. The best crop to prepare ground for onions is onions, but as there must be a first time, let them follow the crop that has had deep plowing, high manuring, and the cleanest cultivation. Manure the ground heavily with the best thoroughly rotted manure. Put it on at the rate of twenty-five tons to the acre, and if you can add to it the cleanings of the poultry house, the pig pen, and your dry earth closet, and a ton or two of pure finely ground bones, all the better. Onions are gross feeders, and require rich manures, and plenty of them. Old onion-growers say that the very best manure in which to grow large prize onions, size to rule, is well-rotted onions. Pulverize the soil thoroughly by plowing, harrowing, and raking, and make the surface as level as possible, to prevent washing by rains, and free from stones. Sow the seed as early in the spring as it is possible to get the ground in good working condition. The earliest sown produces the heaviest crop. In field cultivation the seed is usually sown with a machine used for this purpose only, which sows two rows at once, making the drills and sowing at the one time. In sowing with the machine it will require about four pounds of seed to the acre. If the machine is not used, it will be found convenient to run the drills a foot or fifteen inches apart and sow thinly—say not thicker than an inch apart, if the seed be new and fresh. It is very easy to test the vitality of onion seed. Place a little on some damp cotton or a bit of moss in a warm room—say the kitchen; if it be fresh it will sprout in three or four days. Seed more than one year old is not apt to produce a vigorous plant. Sow shallow, making a mere scratch in which to drop the seed, and cover by rolling a light roller over the ground, lengthwise of the drills. As soon as the plants are an inch or two high they will need hoeing and weeding, and should be thinned out to about two inches apart. Hoe shallow, and do not draw the earth up around the plants, but keep the ground level and clean. Hoe before the weeds start, and much time and labor will be saved. If there be a market for very young onions, they may be allowed to grow for awhile at two inches apart, thinning out to four inches as fast as needed. If there be no use for them, the onions may be thinned to four inches as soon as the plants seem to be well established.

In wet seasons onions sometimes grow thick-necked. To remedy this, growers are in the habit of gently bending down the tops late in

July, with the hoe-handle, which checks their growth and makes them form better bulbs. In August or early in September the onions will be ripe, which is indicated by the dying off of the tops. They may now be pulled or raked out, and left spread out to dry in the sun for two or three weeks, by which time they are ready for market, or storing for winter. The same ground will be the best for onions next year, and so for the next twenty-five years, but it will need to be manured every year very heavily, and if a practice is made of saving all the soot from the chimneys, all the soapsuds from the washtub, and all the slops from the chambers, and spreading it upon the onion patch, the crop of onions will amply repay all the labor.

OPIMUM CULTURE.—The time to commence operating upon the seed capsules (seed pods) is soon after the petals have fallen. The way to do this is to take a common two-bladed penknife, or a pocket knife with two blades of equal length, and both at one end of the handle. Slip a piece of cork or wood on to these blades, pushing the point through one-sixteenth of an inch, or more, according to the thickness of the pod shells. The cork guard is to prevent cutting the pods too deeply when making the incisions, for, if cut through to the seeds, the juice, or a portion of it, will pass inside and be lost. In setting the guard, it is well to cut off a poppy pod and cut it in two; then arrange the blades so that the cut shall not be too deep. Wind the blades below the guard down to the handle, and the tool is ready for use. The afternoon, or just before evening, is the best time to make the incision, as the juice exudes most freely at night. *To Cut*, take the knife in the right hand, with the edges upward; then insert the points at the base of the pods, and pass them up nearly to the apex, making a half dozen longitudinal cuts, dividing them equally around the pods. The cuts may also be made around the pods horizontally, if more convenient for the operator. The object sought is to wound the pod, which allows the juice or opium to exude. The following day the opium should be gathered, commencing after the dew has dried off—say by 9 or 10 o'clock in the morning. *To Gather*, take a small and smooth-edged, but not sharp knife, and gather by scraping off the opium from the pods. A small vessel with a sharp edge must be used in which to put the opium as gathered, because it sticks to the knife, and requires some force to separate it therefrom. When a sufficient quantity is gathered, it may be pressed into small cakes weighing a pound, more or less, and it is then ready for market.

ORCHARDS, To Manage.—The whole of the ground of an orchard should be dug in the autumn and laid up in a rough state for the winter, giving it as much surface as possible in order that the weather may fully act upon and meliorate the soil, thus following it as far as the case will admit. Observe to dig carefully near to the trees, and so as not to hurt their roots and fibres. If the soil be shallow, and if these lie near to the surface, it would be advisable to dig with a fork instead of the spade.

Crop to within two feet of the trees the first year, a yard the second, four feet the third, and so on until finally relinquished; which, of course, would be against the eighth year, provided the trees were planted at thirty or forty

feet apart, with early bearing sorts between. By this time, if the kinds have been well chosen, the temporary trees will be in full bearing, and will forthwith defray every necessary expense.

PARSNIPS, To Raise.—Select a heavy, but clean and rich, loam. Plow it deep, and harrow it thoroughly as early as it can be worked; mark off in rows fifteen inches apart, and drill in the seed or sow by hand. Use plenty of the seed, two or three to the inch, and be sure it is fresh. Go through the rows with a pronged hoe, or other implement, as soon as they can be distinguished. When large enough, thin the plants to stand four or five inches apart, and be sure that they stand singly. Keep the land very clean by frequent hoeing.

PEACH TREES, Management of.—Seedling trees are the longest lived, most prolific and most profitable. Secure a good variety of pits which produce the same kind of fruit—these are rare. Plant pits where you desire your trees to remain, or, if transplanted, they should be of the first year's growth. After your trees have attained to a proper size, cut back, and prevent their bearing; this will cause the roots to spread in the soil, and will add to the longevity of the tree. Trees which send down one large root and small fibrous roots, will soon become covered with moss and die. Use coal ashes and soap suds plentifully, and if you wish to keep the trees from blooming early, spread manure, coal ashes or sawdust deeply upon the roots when the ground is hardest frozen, and do not remove till late in the spring. (This has been sold as a great secret.) The largest roots of a peach tree will be found upon the north and west sides. Branches grow fastest toward the south and the east.

PEACH BORER, To Destroy.—One method is to bank up to the height of from 8 to 10 inches, adding a little each successive spring. This, it is said, will prevent the depredations of the peach borer. Another is the use of scalding water. Early each spring scrape around the trees with a large knife on the morning of "washing day." When the washing is done, take buckets full of boiling suds into the orchard, and dash the trees just where the trunks join the ground. In this way thousands of little worms are scalded to death. Another is by the use of carbolic acid soap, and lastly by potash, as follows:

PEACH TREES, Potash for.—Dr. George B. Wood, President of the American Philosophical Society, having noticed that his peach trees, after producing a few crops, ceased bearing, and died in a few years, and believing that the cause of decay was worms at the roots of the tree, put into operation a plan for the destruction of the worms. He dug holes five or six inches deep at the base of the stem, scraped away all worms that could be found, and filled up with wood ashes fresh from the stove, which, of course, contained all the potash. This was done in the autumn, and with a result in the following spring at which he was astonished. The trees appeared to have been restored to all their early freshness and vigor—put forth bright green leaves, blossomed copiously, and bore a heavy crop of fruit.

PEARS.—The best soil for the pear is a moderately heavy, sandy, and dry soil, with a subsoil of light clay which is easily penetrated by

the roots to a great depth; a moderate portion of iron in the soil is desirable. The best situation is an undulating eastern or southern exposure. The best fertilizers, as in the case of the apple, are barn-yard manure, lime, and bone-dust. Iron cinders are a good application when there is a deficiency of that element in the soil.

PEANUT CULTURE.—It requires about two bushels to plant an acre. Well cured seeds are essential. The soil selected should be friable and light; red or chocolate-colored soils stain the nuts and impair their value. Land that has been in corn, or other hoed crops, except sweet potatoes, is preferred, and if it has not been heavily marled for previous crops, may be dressed with 150 bushels of marl or 50 bushels of lime to the acre. These may be sown broadcast or strewed in the furrow over which the beds are to be raised. The soil of a peanut farm requires to be continually renewed by very heavy dressings of marsh mud, woods litter and lime, and the putting of a piece of land in order for a single crop costs a good deal more per acre than is required to purchase good cotton land in the South. It is a very exhausting crop—it is therefore customary not to take a crop of peanuts from land oftener than once in three years.

PRUNING.—The practice of indiscriminate lopping off of limbs, large and small, is the cause of disease and a weakening of the constitution of the tree, which in numberless cases leads to premature death. It has been found in nine cases out of every ten, where a branch of considerable size had been taken off it would leave a rotten spot in the tree. In a great many varieties of the apple tree, where any incision is made in the tree, there is a liability to decay and rot. The tree may, and perhaps in most cases will, heal over this, but a diseased spot is left in the tree, and hence to that extent is left in an unhealthy state. And the more these spots are multiplied, the more is the tree weakened and diseased.

PLANTS, HOUSE.—See "Gardening—(Window)."

PLANTS, (House) LICE ON, To Destroy.—Take some of the common fine-cut smoking tobacco, strong, and sprinkle it over the top of the earth about the plant, and keep the plant well watered. The strength of the tobacco now passes through the earth and about the roots, and is just as sure to kill all creeping things as it is used and is a great benefit to the plant. These worms, etc., die, and with the strength of the tobacco form a most valuable manure for the plant, and those using it will find that the plant will soon show much more vigor and begin to grow very fast.

PLANTS, Boxes for Starting.—There is not any better for this purpose than paper boxes. To make these boxes, cut strips of thick paper about 6 inches wide and 17 long; paste the ends together, lapping an inch, which will make a circle 16 inches in circumference; then press the sides of the circle together flat, and double once, making a book of four uncut leaves; now open with the fingers, pinch down the corners properly, and a bottomless box 4 inches square is the result. Place as many of these as are needed close together in a wooden box, fill with earth, and sow seeds or prick out the plants. It is best not to have the box that holds the paper

ones so high by 2 inches as they are, as the paper then does not decay so rapidly as in higher boxes, and holds the earth together better in transplanting.

PLANTS, (Outdoor,) LABELS FOR.—A convenient method of preparing outdoor labels for plants, capable of resisting weather, consists in first cutting them out of smooth pasteboard, and writing upon them whatever may be desired in ordinary ink. When this is dry they are immersed in linseed soil, or, what is still better, linseed-oil varnish, until they are completely permeated by the liquid; after which they are hung in the open air upon threads to dry; they become like iron, and resist wet for a long time, and are more durable than slips of metal.

PLUM, THE.—The plum tree is hardy, and requires but little attention; it bears abundantly, and may be considered a sure crop when the soil suits. The best for it is a stiff clay, which is not suitable to the habits of the curculio, the great enemy of the plum.

POTATOES, Earthing Up.—It has been demonstrated that earthing up potatoes diminishes the product, and retards the ripening of the tubers. Long experiments in England have fully proved this fact—that hilling up the potato will reduce the crop one-fourth.

POTATOES, RAISING, Under Straw.—We give an experiment in raising potatoes under straw, by a noted agriculturist: "I fitted the ground as for planting in the old way, by marking rows one way, three feet apart, and dropped the potatoes on the mark from eighteen inches to two feet apart, covering them slightly with soil. I then covered to about the depth of ten inches with old straw, and did nothing more with them. When the crop was ripe I raked off the straw, and raked out the potatoes, which were mostly on the surface, looking very nice, fresh and large. The result was, I had at the rate of one hundred and eighty-six bushels per acre; while the yield from those planted the old way in drills, and cultivated on ground by the side of them, was only seventy-five bushels per acre, which was rather small for this section, owing to the dry season. The soil is a sandy loam."

POTATOES, SWEET.—The first week in June is quite early enough to set out sweet potatoes in northern localities. Where but a very few are grown, it is much easier and cheaper to buy the plants than it is to start them. They carry readily by express. In preparing the soil, put upon the level surface a strip of fine manure a foot wide, and turn two furrows over it to form a ridge. Dress up the ridge with the spade, and set the plants about fifteen inches apart. Unless the soil is moist, water the holes before setting the plants, which should be set well down, so that the stalk of the first leaf is covered. Press the soil firmly around the plants—much of the success will depend upon this. Should the tops wilt and dry up, a new shoot will spring up if the plant has been set deep enough. The sides of the ridges should be kept free of weeds by the proper use of the rake. The vines will soon get so large as to smother most of the weeds.

POTATO ROT, Barnes's Certain Preventive for the.—Sow unleached ashes over the field once a week for six or seven weeks, commencing soon after the second hoeing. Apply two or

three bushels to the acre, using care to dust the tops well.

POTATO BUG, (Colorado,) To Destroy.—A great many preparations have been invented to destroy this marauder on the potato fields. The principal ingredient in all is the powdered paint known as Paris green. Its poisonous effect upon the plant is obviated by the admixture of other ingredients. The Paris green, according to price, is more or less pure. If unadulterated, it should be mixed with four, five, or six times the quantity of meal, flour, ashes, calcined plaster and lime. The more it can be diluted, without destroying its efficacy, so much the less expensive it will be, and the less injurious to the vines, and also the less dangerous to the operator.

PLOWING AND HARROWING.—Never plow, if it can be avoided, or go on the ground for any purpose, when it is wet and sticky; keep the furrows straight, and, if possible, reverse them at every plowing, so as to keep the land level. To fill in furrows, back-furrow pretty widely once around, and haul once around very wide; this will generally be sufficient. Harrow soon after plowing, and before the lumps, if any, get dried hard; twice over with the teeth down, and once with the back of the harrow, will prepare the land for ordinary crops.

PLOWS, (Rusty,) To Clean.—Take a quart of water and pour slowly into it half a pint of sulphuric acid. (The mixture will become quite warm from chemical action, and this is the reason why the acid should be poured slowly into water, rather than the water into the acid.) Wash the mould-board (or any other iron that is rusty) with this weak acid, and let it remain on the iron until it evaporates. Then wash it once more. The object is to give time for the acid to dissolve the rust. Then wash with water, and you will see where the worst rusty spots are. Apply some more acid, and rub those spots with a brick. The acid and the scouring will remove most of the rust. Then wash the mould-board thoroughly with water, to remove all the acid, and rub it dry. Brush it over with petroleum or other oil, and let it be until spring. When you go to plowing, take a bottle of the acid water to the field, and apply it frequently to any spots of rust that may remain. The acid and the scouring of the earth will soon make it very bright and smooth.

PUMPKINS Amongst CORN.—Almost all "old-fashioned farmers" take a crop of pumpkins off their corn fields, much to the annoyance of the theorist who demonstrates to his entire satisfaction that the one crop must detract from the full force of the other. But the most careful experiments show no loss to the corn. The very same weight results from an acre, with or without the pumpkins.

QUINCES, To Cultivate.—The quince appears to flourish best on a rather stiff and moist soil, in somewhat sheltered locations. Get the "Orange" variety. See that they are entirely free of the borer before planting. Set eight feet apart in rich soil. Bandage the stem with two or three wrappings of muslin, or any kind of cloth, as far down in the ground as possible, as the roots start from near the surface. Let this bandage run six or eight inches above ground, then pile the soil compactly a couple of inches around the bandage, and renew this early every

spring. Fine, large golden quinces, rivaling the largest oranges, will reward your efforts, annually.

Should the borer by any means steal in, the same plan may be adopted for its destruction as in the apple. Should they, however, get the advantage of you, and your trees become honey-combed, set out again young trees, so that by the time the old ones are gone the young ones will be finely in bearing.

RADISHES.—It is said that, when radishes cannot be grown on account of worms or unsuitable soil, if common wheat bran be strewn one inch thick on any good soil, well hoed in, and the seed is then planted, perfect radishes will result.

RAIN, To Produce.—Rain is such a necessity to the success of crops, that whatever will aid its occasional appearance should be cultivated. It has been proved without doubt that trees do this, for it has been noticed that wherever the country has been denuded of its forests rains gradually become more infrequent, and that in parts of the country where formerly there was little or no rain—as on the western prairies—and trees have afterward been planted, occasional and copious rains have always resulted. Farmers should be guided by this fact.

RASPBERRIES.—Raspberry canes, when set out, should be planted three feet apart in the row, and the rows three and a half to four feet apart. Cut down the canes to within six inches of the ground and set firmly. Prefer a rather moist spot for them, and if in the shade a portion of the day so much the better. They can be planted under fruit trees, where scarcely anything else will grow, and the berry will be much larger and finer. They like a cool, moist soil, kept so by liberal mulching with leaves, light manure, or any trash, and if a foot in depth it is an advantage.

RENNET (also called Runnet.)—The Bavarian mode of curing consists in turning out the contents of the skin of the stomach, wiping off all specks or dirt with a cloth, and then blowing up the skin or filling it with air like a bladder. The ends are tied with a string, and a little salt applied to this part only. The skin, treated in this way, soon dries perfectly, and is as sweet and clean as can be desired. Salt neutralizes in some degree the action of rennet, therefore the rennets treated on the Bavarian plan are much more effective than those cured in the old way. When the rennets cured on this plan are dry, the air may be expelled, and the skins can be packed away in a small space, and are easily kept clear of insects. The defect in salted rennets is, that the salt in wet weather accumulates dampness, and, if care is not taken to keep them in a dry place, they drip, and thus lose their strength.

RENNET, Mode of Use.—The way to use rennet is to cut off a bit of suitable size (a piece an inch square is large enough to coagulate several gallons of milk) and soak it for some hours in water; then add the whole to the milk, a little warmed. The mixture is now very gradually heated to something above blood-heat, or about 120°. Very soon it undergoes a great change, and a solid white curd is separated from the whey.

RHUBARB, Transplanting.—All rhubarb plants ought to have a heavy dressing of manure every spring, to be forked in, and two or three

hoeings through the season to keep down all the weeds. It is a great point to have the stalks tender, and to secure this they ought to be grown rapidly under stimulating manures or a warm, rich soil. The ground before setting out ought to be plowed thoroughly and subsoiled or trenched deeply, and, if necessary, drained. Turn under a plenty of well-rotted manure, at the rate of at least sixty or seventy horse cart loads to the acre, for the greater the quantity of manure, the larger and finer will the rhubarb grow, and the larger and finer it is the more it will bring.

RHUBARB, Transplanting.—Rhubarb roots require replanting occasionally. If the stools remain undisturbed for several years, they often commence to decay in the centre, and after a while the whole plant becomes diseased. Every four or five years the stalks should be lifted and divided, leaving but one large crown, with its accompanying roots attached. These may be again planted in the same soil, or upon some fresh plot, the latter method being preferable, although we are not a very strong disciple of the theory that plants run out if grown for many years in the same soil.

ROCKS, To Remove.—See "Boulders."

RYE, To Cultivate.—Rye ought never to be sown upon wet soils, nor even upon sandy soils where the subsoil is of a retentive nature. Upon downs, links, and all soft lands which have received manure, this grain thrives in perfection, and, if once covered in, will stand a drought afterwards that would consume any other of the culmiferous tribe. The several processes may be regarded as nearly the same with those answering for wheat, with the single exception of pickling, which rye does not require. Rye may be sown either in winter or spring, though the winter-seeded fields are generally bulkiest and most productive. It may succeed either summer fallow, clover or turnips; even after oats good crops have been raised, and where such crops have been raised the land will always be found in good condition.

SAGE, To Cultivate.—Put it out in rows two feet apart, and the plants a foot apart in the rows. Cultivate and keep clean; it does well in sandy soil. Dry in the shade. Put up in square pound packages hard pressed.

SEED, How to Select.—It is of very great importance that the farmer, whose desire it is to have splendid grain and root crops, be very careful in his choice and selection of seed. He will see to it that they are large, plump, perfect, and of uniform size. In the selection of many seeds it will pay the farmer to carefully examine with a powerful magnifying glass, and reject all that do not meet the above requirements.

SEED CORN.—In shelling corn for seed, discard the butts and tips, using only the central portion of each ear, as the early blade and root are in size in proportion to the kernel used; and a plant from the large grains of the centre of the ear will get the start and keep ahead of the small ones from the tip. And especially select from ears that have the grains as near uniformly large as possible.

SEED BARLEY.—The best is that which is free from blackness at the tail, and is of a pale lively yellow, intermixed with a bright, whitish cast, and if the rind should be a little shrivelled, so much the better, as it indicates a very thin skin.

SEED OATS.—Place your oats in a heap at the leeward end of the threshing floor on a day when a gentle breeze is blowing through the barn. Take a common wooden flour-scoop, and throw the oats against the wind, towards the other end of the floor. A few minutes' experience will enable you to throw them so that they will fall in a semi-circle at a nearly uniform distance from where you stand. The oats which fall farthest from you are the best for seed, and are to be carefully swept together as fast as they accumulate in considerable quantities.

SEED POTATOES.—Be careful to secure large, sound, and well-ripened seed; cut the large potato into pieces of one eye. Begin at the butt end; cut towards the centre, leaving a due proportion of the potato with each eye. Potatoes inadvertently left undug, if they do not freeze during winter, invariably produce sound ones, larger and more abundant than those kept in the cellar through winter. This has lately suggested the plan of keeping potatoes excluded from the air from the time of digging and planting, which has been found to invariably prevent rot.

SEED WHEAT.—Seed wheat should not only be thoroughly cleaned from the seeds of weeds, but small grains should be taken out with a separator or suitable fanning mill, leaving only the largest, plumpest, and earliest ripened kernels.

SEED, How to Test the Vitality of.—By placing almost any of the larger seeds and grains on a hot pan or griddle, where the vitality is perfect the grain will pop, or crack open with more or less noise. Where the vitality is defective or lost, it lies immovable in the vessel.

SEED, To Improve All Sorts.—Charles Miller, son of the celebrated botanist, published a recipe for fertilizing seed, and tried it on wheat, by mixing lime, nitre, and pigeon's dung in water, and therein steeping the seed. The produce of some of these grains is stated at sixty, seventy, and eighty stems, many of the ears five inches long, and fifty corns each, and none less than forty.

SLUGS AND SNAILS.—These are great enemies to every kind of garden plant, whether flower or vegetable; they wander in the night to feed, and return at daylight to their haunts; the shortest and surest direction is: "Rise early, catch them, and kill them." If you are an early riser, you may cut them off from their day retreats, or you may lay cabbage leaves about the ground, especially on the beds which they frequent. Every morning examine these leaves, and you will find a great many taking refuge beneath; if they plague you very much, search for their retreat, which you can find by their slimy track, and hunt there for them day by day. Lime and salt are very annoying to snails and slugs; a pinch of salt kills them, and they will not touch fresh lime; it is a common practice to sprinkle lime over young crops, and along the edges of beds, about rows of peas and beans, lettuces and other vegetables; but when it has been on the ground some days, or has been moistened by rain, it loses its strength.

SMUT IN WHEAT, Remedy for.—Soak the seed wheat in brine, and then dust it with unslaked lime. This will prove a perfect prevention.

SORGHUM CULTURE.—The soil and cli-

mate suitable for the cultivation of corn is well adapted to the growth of sorghum, but a rich upland loam will yield the richest juice. The land should be well worked, and kept clean, it requiring about the same treatment as corn. It may be either planted in hills or drills. As the cane is a very deep-rooted plant, it is very essential that the land should be made mellow to a good depth, but the seed should be covered very shallow, not more than half inch deep. It should be planted about the same time as corn. The young plants when they first come up look like blades of fall grass; they are of slow growth and feeble appearance for some time, or until the hot weather of July and August, when the plants will go far ahead of corn in a rank and healthy growth. It appears to delight in hot, dry weather, as its roots penetrate deep. Drouth does not affect it as it does corn; it is surprising to see at what a rate it will develop itself after the hot weather has come. It is also very hardy, and may be transplanted with entire safety. There is a difference of opinion in regard to keeping the suckers pulled off. Experience shows that, although we may lose a little in quantity, it is more than made up in the quality of the syrup; therefore have a deep, mellow soil for the roots to penetrate in search of food by thoroughly cultivating it during the early stage of its growth; but avoid deep plowing after the cane has once acquired considerable size, as the roots then fill the ground, and if severed the plants are greatly dwarfed; keep the suckers off, and be sure and not let a weed show its head.

SORREL, To Remove. This field pest may be eradicated by the judicious application of either lime or ashes. The souring principle of sorrel is oxalic acid; if this be removed from the soil, sorrel cannot grow. Lime or potash unite with the oxalic acid, forming oxalate of lime or potash. These substances are sometimes called sweeteners of the soil, from their ability to remove acids from it. Sorrel will never grow on lime soil.

SQUASH, Cultivation of.—The squash, being a tropical vegetable, requires much care and attention in northern latitudes in order to be cultivated with success. Of all the varieties tested, the "Hubbard" has proved to be the very best for winter. The planting should be done as early in the spring as possible after the weather becomes sufficiently warm, so that there will be no danger of frost nipping the young plants, as they are very tender. A few hills can be planted earlier, and covered with hay or straw when there is danger of frost; in fact, if the season is late, it will pay well to plant a goodly patch and protect them in that way, for a very few young plants will cover a wide space of ground when old.

The land should be made deep and rich, the richer the better, particularly in the hills; the best manure being composted hen-droppings. The soil should contain a sufficient amount of sand to make it quick and warm, and a piece of land should be selected sloping well to the south so that the rays of the spring sun can be quickly felt by the young plants.

Plant in rows at least 16 feet apart, in hills from 8 to 10 feet; putting from 2 to 3 seeds in a hill, and when well started thin out to 1 plant. Cultivate thoroughly all the ground between the rows, as well as around the plants, until the vines

cover the ground. If the above hints are followed a good crop will result.

STRAWBERRY CULTURE.—For this fruit the most suitable soil is light and sandy. It may be enriched by ashes, bone, barnyard manure, etc. The plants should be set one foot apart, in rows two feet from each other. Put in the young plants from the middle of August to the middle of September. Keep the ground mellow and free from weeds. In the following spring manure and hoe the ground well, to keep it moist and free from weeds. With such care, a quart of fruit has sometimes been picked from one plant, the next season after planting. Some cultivators prefer to cut off all the blossoms the first spring, so as to strengthen the plants for growth.

STRAWBERRY PLANTS, Protecting.—In latitudes where snows fall about the first of December, and remain on the ground all winter, no other protection to strawberry plants is needed; but in all other sections of the country, some slight covering is necessary, as poor hay, straw, leaves, or the coarse barn-yard litter, that is always thrown out of stables with manure. For garden plats of plants barn-yard litter, mixed with manure, is the best protection that can be used, acting as a fertilizer at the same time, by being drenched with rain. In field cultivation of strawberries, near the ocean, salt hay makes a cheap and good protection. Rye straw is very good, but more expensive than salt hay. The plants should be covered but slightly, about two inches deep with whatever may be used. If it is put on thicker there is liability to smother the plants. Early in December is a good time to mulch strawberry plants, if not done before.

STUMPS, To Remove.—One method is as follows: In the fall of the year bore a 1 inch hole 18 inches deep into the centre of the stump and put in an ounce of saltpetre, filling up with water, and plugging the hole up. In the spring take out the plug, put in half a gill of kerosene and set fire to it. It will burn the stump out to its farthest root. Here is another plan: In the fall, with an inch auger bore a hole in the centre of the stump 10 inches deep, and put into it a ½ lb. of oil of vitriol, and cork the hole up very tight. In the spring the whole stump and roots extending all through their ramifications will be found so rotten that they can be easily eradicated.

STUMP MACHINE (Home Made.)—Take 3 pieces of common joists, put them together in form like the common harrow, letting the tapering ends lap by each other some 6 inches, making a place for the chain to rest in. Cut off the roots at any distance you please from the stump, place the machine on one side of the stump, tapering end up; hitch the chain on the opposite side and pass it over the machine; then hitch a good yoke of oxen thereto, and you will see the stump rise.

SUBSOILING.—The subsoil plow has now become one of the most important implements upon the farm. It is used to run in the bottom of the furrow before the potato is dropped, to loosen the earth under the seed, to admit the air, and after the potatoes are up a one-horse subsoil plow is run between the rows, and, when properly done, it is equal to trenching with a spade. It is also run between the rows of corn, when the corn is about four inches high. This will

lift the soil slightly, and also the young corn plants, but will not separate the particles of earth from the roots. This will be a more thorough disturbance of the soil than a dozen hoeings, and will permit the corn roots to descend in search of food. In raising carrots, beets and turnips, in heavy ground, it is almost indispensable.

SUGAR, New Mode of Making.—A new way of extracting the juice from sugar cane has been practiced at Aska, in India, during the past few years. It is founded upon what is known as the "diffusion" process of extracting the saccharine matter from beet roots, and which is in use in about one hundred and fifty beet sugar factories in Europe; it consists substantially in washing out the sugary juice by soaking in water. The cane is cut by machinery into thin transverse slices, which, when treated with water, yield a bright yellow liquid, that on boiling yields very little scum, and which, provided the cane be fully ripe and in good condition, does not require to be filtered through animal charcoal, but can be transferred at once to the evaporators and vacuum pans for the fabrication of a good grade of raw sugar.

SUNFLOWER, The.—The sunflower is very useful. Its leaves soon become large enough to be used as a covering for young cabbage and tomato plants. Its stem affords an excellent hop or bean pole, and when dead in the fall, if cut up and kept dry, it answers well for kindling-wood. The leaves can be plucked off through the summer without injury to the plant, and then dried for fodder, or feed green to milch-cows or horses. Its seeds make a fine oil, or chicken feed. It is said to be an absorbent of malaria, and is often cultivated as a preventive of fevers near dwellings that occupy low places. Plant in drills 4 feet apart, and 18 inches in the drill, requiring 2 quarts of seed per acre. Many of the stalks grow 16 feet high. They want rich land. From 8 to 10 tons of leaves have been gathered from an acre. The first leaves are generally pulled in July, going up 3 or 4 feet high. The next pulling is as high as a man can reach, putting a dozen bundles in a shock, as soon as the seed glazes. In winter the seed is threshed with a flail, the main heads reserved for seed, and the small ones threshed separately. The main heads gave thirty-one bushels per acre, and the small ones sixteen bushels—forty-seven per acre.

THISTLES, CANADA.—To effectually destroy Canada thistles, allow them to grow until about the middle of June; their vitality has then greatly expended itself; then plow the land deeply and well, and afterwards harrow fine and level; then, and during the remainder of the season, horse-hoe with such a horse-hoe that cannot possibly miss one top of a thistle, first one way, then across, and again, until the season for growth has entirely gone by. Another method is, after the land is well saturated with moisture, draw them by hand with stout gloves, with a piece of old sacking sewed over the palm, to prevent the plant from slipping when the gloves become wet. With a very little care, the thistle may be drawn with 6 or 8 inches of the root; and you will be rid of the nuisance in two seasons.

TIMBER, To Test the Soundness of.—Large trees of valuable timber are frequently unsound

—either hollow, "dozy," or full of cracks at the butt-end, even when the external appearance indicates a good condition of the interior or heart. This is particularly the case with white-oak timber. Large and valuable trees have frequently been purchased at an exorbitant price for some special purpose. But when the woodman's ax had made a kerf half-way to the middle of the butt, the interior was found to be dozy or hollow, rendering the timber wholly worthless for the purposes intended.

In order to determine whether the heart of a tree is defective, without cutting into it with an ax, the most expeditious way is to bore into the butt, say one foot from the surface of the ground, with a two-inch auger, drawing out the chips frequently for examination. In case the tree is of so large dimensions that the heart cannot be reached with an auger of ordinary length, an iron rod one or more feet long may be attached, either by welding, or by means of a socket made in the rod to fit the shank of the auger. An auger-hole near the ground will not injure a tree for timber, except in case it is to be employed for sleigh-runners or for ship-building.

TIMBER, Best Time for Cutting.—The best time to cut timber is in midsummer, just after the sap has ceased to flow upward, when the leaf is fully formed. Some contend that midwinter is equally as good, but while contending that timber cut in midsummer lasts well, we may say from experience, and according to the authorities on the subject, that the former time is best. Again, by cutting in midsummer, the bark can be stripped off and saved, which, in many localities, is a matter of great importance. This is a difficult thing to do in winter, as then it clings closely to the wood.

TRANSPLANTING.—The frozen-ball way of removing ornamental trees is preferred by a great many to all others for some purposes. It is well adapted to evergreens growing wild, if they are of much size. In order that it may be easily and expeditiously performed, preparations should be made in autumn, or before the ground freezes hard, by digging a trench in the shape of a circle about every tree a foot deep, or as far down as the frost penetrates, and then filling these trenches with dead leaves, which are generally very abundant indeed at that time of the year in the borders of woods, or wherever these trees are sought.

The leaves will prevent the trenches from ever freezing in winter, and the earth within them being frozen hard, the trees are easily loosened and tipped over, and may then be readily transferred to sleds and conveyed to their place of destination, where holes, dug at the same time that the trenches were made, and similarly filled with leaves if convenient, or left open and froze, may receive them. If holes and balls are both frozen hard, and are nearly equal in size, the first thaw will soften the ball and give it a close fit. But it is rather better to keep the hole unfrozen, so that the balls may be snugly imbedded in the mellow earth when placed there.

TRANSPLANTING, Position of Trees.—The theory has been broached that trees bend toward the east, and that in transplanting them care should be taken to set them in the same position, relative to the points of the compass, that they had before transplanting.

TRANSPLANTING During the Night.—

A gentleman, anxious to ascertain the effect of transplanting at night, instead of by day, made an experiment with the following results: He transplanted ten cherry trees while in bloom, commencing at four o'clock in the morning. Those transplanted during the daylight shed their blossoms, producing little or no fruit, while those planted in the dark maintained their condition fully. He did the same with ten dwarf trees, after the fruit was one-third grown. Those transplanted during the day shed their fruit; those transplanted during the night perfected their crop, and showed no injury from having been removed. With each of these trees he removed some earth with the roots. The incident is fully vouched for, and if a few more similar experiments produce a like result, it will be a strong argument to horticulturists, etc., to do such work at night.

TRANSPORTATION OF VEGETABLES, Rules for.—The first principle to be observed is the packing, and the main point in this is ventilation.

Onions and potatoes should be fully matured before shipment, for if they are not fully matured and packed dry, they will easily rot. Do not expose them long to the sun to dry, but as they become dry pack them, for the sun will burn them.

Tomatoes should be pulled just on the turn to ripen. If they are pulled too green they will rot before they will ripen, and if pulled ripe they will rot before they reach their destination.

Cucumbers, peas and beans should be ripe, but not enough to be liable to turn yellow, they being saleable only while having a green color.

Citron melons should be shipped green—nearly matured.

Watermelons should be ripe.

Onions, tomatoes, cucumbers, peas and beans should be shipped in bushel crates.

Potatoes should be shipped in barrels well ventilated. Bore at least three holes an inch in diameter in each stave, and several in the bottom. Cover with stout cloth covers, and cooper the barrels.

Cull the Irish and sweet potatoes well before shipment, and the culls can be shipped marked "culls." They will bring half price. If they are shipped mixed in with large potatoes they will injure the sale of them. Every one will find it advantageous to ship good quality stuff.

Water melons and citron melons can be shipped in three bushel crates, made the same as the bushel crate, but much stronger.

Always fill the crates well, packing the articles tightly, so they cannot shake about, and they will not rot as quick as they would if they could shake about.

TREES, (SHADE,) Best to Plant.—A moderate number of trees are necessary on every farm, both for shelter and shade. Some farms have been completely denuded by the ax of the wood-chopper, and, as screens and shade trees are almost indispensable, the most desirable and profitable are black walnut and sugar maple. The walnuts will bear abundantly in 8 or 10 years from the time of planting, and the timber will be increasing in value every year. The sugar maple is a beautiful shade, and its product is exceedingly valuable. It is a good plan to raise the trees in some corner of the orchard or garden until they have become strong.

TREES, OAK.—The process of deforesting our lands upon the Atlantic border has gone on for centuries, and in the very populous States has necessitated replanting. It is a fact not sufficiently known, that oaks may be rapidly grown, and will develop, within an ordinary lifetime, fine groves of those noble trees which give so much dignity to an old homestead. Major Ben. Perley Poore has upon his estate in Massachusetts, a splendid oak forest or wood of 30 acres, every acorn for which was planted by himself 30 years ago. The trunks of the trees are now $1\frac{1}{2}$ feet in diameter.

TOADS.—Toads are among the best friends the gardener has; for they live almost exclusively on the most destructive kinds of vermin. Unwisely, therefore, though they may be, they should on all accounts be encouraged; they must never be touched nor molested in any way; on the contrary, places of shelter should be made for them, to which they may retire from the heat of the sun. If you have none in your garden, it will be quite worth your while to search for them in your walks, and bring them home, taking care to handle them carefully, for although they have neither the will nor the power to injure you, a very little rough treatment will injure them.

TOMATO PLANTS, To Raise.—Make a hot bed in the customary way about 3x6 feet. On about 3 square feet at one end, sow your seed 1-16 of an inch thick; cover with $\frac{1}{2}$ an inch of rich, sifted soil. When the plants are 3 inches high, make a trench across the bed, leaving one side at an angle of 52 degrees. Wet the plants so that they can be taken up without injuring the roots. Place them in the trench 2 inches apart. Cover them up to the last leaves by making another trench so near that the rows of plants will be 3 inches apart. When they are from 4 to 6 inches high transplant them into the garden, taking care not to injure the roots. Plants raised as above directed will be very stocky, will not wilt when transplanted, and will ripen their fruit before frost comes.

TOMATOES, Cultivation of.—Set your tomato plants in rows three and a half feet apart, and the same distance apart in the rows. Let the rows be of an even number, and, if possible, running north and south, for the better advantage of the sunshine.

Now, beginning with the first couple of rows, at one end set a pair of stakes in such manner that they will enter the ground just outside of the line of the rows, and cross each other at the height of about four feet over the middle space. Set corresponding stakes at the opposite end of the rows, and also intermediate ones, if necessary.

This done, along the outside of these sloping stakes fasten horizontal strips of edging, beginning with the first about eight inches from the ground, and finishing with the one which will run in the crossing of the stakes.

As the plants grow, carefully train them over this framework, securing them in place by tying with strings, and judiciously trimming when needed.

After the crop is removed in the fall, the material of this simple structure may be easily taken apart and laid away for use the coming and subsequent seasons.

TOMATOES, French Mode of Cultivating.

—The French method is as follows. As soon as a cluster of flowers is visible they top the stem down to the clusters, so that the flowers terminate the stem. The effect is, that the sap is immediately impelled into the two buds next below the cluster, which soon push strongly and produce another cluster of flowers each. When these are visible the branch to which they belong is also topped down to their level, and this is done five times in succession. By this means the plants become stout, dwarf bushes, not over eighteen inches high. In addition to this, all the laterals whatsoever are nipped off. In this way the ripe sap is directed into the fruit, which acquires a beauty, size and excellence unattainable by any other means.

TURNIP CULTURE.—The most desirable soil for the cultivation of this root is a sandy loam free from stagnant water—one easily cultivated to a considerable depth, notwithstanding that a heavier crop may occasionally be obtained from a clay loam.

Early in the fall the land intended for turnips should receive a heavy coating of farmyard manure, and be deeply plowed; cross-plowed in the spring about the end of May or the beginning of June, harrowed and rolled until a fine tilth is secured. Getting the soil into a finely divided state is a matter of the highest importance. It is a well established fact that all soils have the power of absorbing and retaining to a greater or less degree a certain amount of moisture, and the more finely divided and thoroughly pulverized the land, the greater amount of moisture will it absorb and retain. It would be very difficult to state absolutely when is the best time to sow, inasmuch as soils and seasons vary. On clay or clay loam perhaps the most desirable time is from the fifth to the fifteenth of June, and on sandy loams from the tenth to the twentieth of that month. The quantity of seed required per acre will also vary with the weather. In damp weather, on sandy soils, 2 lbs. is ample, and on clay loam, and in weather ordinarily dry, it will be well to use 3 lbs. or more. The depth of the seed should be from 1 to 1½ inches below the surface. It is better for plants to come up thickly, for they grow faster than when thin, and are more apt to escape the ravages of the fly; and, moreover, they require immediate attention as soon as they are large enough to thin. Sowing upon drills is altogether preferable to sowing on the level; not only can a much larger crop be produced, but the weeds are far more easily destroyed. The distance between the drills should be from 26 to 30 inches, and the plants should be left, by thinning, 12 to 15 inches apart. When a good braird has been secured, the great secret of success is in stirring the soil frequently when dry, and keeping the ground perfectly free from noxious weeds.

WAGONS, To Grease.—But few people are aware that they do wagons and carriages more injury by greasing too plentifully than in almost any other way. A well made wheel will endure common wear from ten to twenty-five years, if care is taken to use the right kind and proper amount of grease; but if this matter is not attended to, they will be used up in five or six years. Lard should never be used on a wagon, for it will penetrate the hub, and work its way out around the tenons of the spokes, and spoil the wheel. Tallow is the best lubricator for

wood axle trees, and castor oil for iron. Just enough grease should be applied to the spindle of a wagon to give it a light coating; this is better than more, for the surplus put on will work out at the ends, and be forced by the shoulder bands and nut washers into the hub around the outside of the boxes. To oil an iron axle tree, first wipe the spindle clean with a cloth wet with spirits of turpentine, and then apply a few drops of castor oil near the shoulder and end. One teaspoonful is sufficient for the whole.

WALNUT TREE.—The most common mode is to propagate from the nut or seed. It is also propagated by a species of grafting called "marching," by budding, and by grafting by the "approach" method. In any common fertile soil the walnut will succeed, but it thrives best in a good depth of loam, mixed with sand or gravel. Those who intend planting walnuts should procure plants from the nursery, either marched or budded, and in as advanced a stage of growth as is compatible with their safe removal. Plants from 8 to 12 years old may be safely removed, if properly prepared by previous transplantation. Plants for fruiting should be planted 20 feet distant from each other. The usual period at which they commence bearing is 18 or 20 years. The fruit is produced on the extremities of the previous year's shoots, and should be gathered so as not to injure the tree.

WEEDS, To Destroy.—Annual weeds, or such as spring from seed and die the same year, are most easily destroyed. For this purpose it will be sufficient to let them spring up till near the time of ripening their seed, and then plow them down before it comes to maturity. It is also of service to destroy such weeds as grow in borders or neglected corners, and frequently scatter their seeds to a great distance—such as the thistle, dandelion, rag weed, etc., for these propagate their species through a deal of ground, as their seeds are carried about with the wind to very considerable distances. A farmer ought also to take care that the small seeds of weeds, separated from corn in winnowing, be not sown again upon the ground; for this certainly happens when they are thrown upon a dunghill, because, being the natural offspring of the earth, they are not easily destroyed. The best method of preventing any mischief from this cause is to burn them. Perennial weeds are such as are propagated by the roots, and last for a number of years. They cannot be effectually destroyed but by removing the roots from the ground, which is often a matter of some difficulty. The only method that can be depended upon in this case is frequent plowing, to render the ground as tender as possible, and harrowing with a particular kind of harrow, in order to collect these pernicious roots. When collected, they ought to be dried and burnt, as the only effectual way of insuring their doing no farther mischief.

WEEDS IN WALKS, To Destroy.—A most efficient agent for the destruction of weeds, and one that is not expensive, can be made by boiling 4 lbs. of arsenic and 8 lbs. of soda in 12 gallons of water. To every gallon of this boiling mixture 3 gallons of cold water should be added, and the liquid carefully sprinkled over the walks while it is yet warm. It is desirable to do this in fine weather, and when the walks are dry, so that the weeds and weed-seeds may

have the full benefit of the application. Care must be taken not to let any of the liquid fall on the leaves or reach the root of any plants it is not desired to kill. In 24 hours after the poison is put on the walks every weed will be killed; and, if it be once thoroughly done, it will keep the walks clean through the whole season.

WHEAT, To Prevent Mildew in.—Dissolve three ounces and two drachms of sulphate of copper, copperas, or blue vitriol, in three gallons and three quarts, wine measure, of cold water, for every three bushels of grain that is to be prepared. Into another vessel, capable of containing from fifty-three to seventy-nine wine gallons, throw from three to four bushels of wheat, into which the prepared liquid is poured, until it rises five or six inches above the grain. Stir it thoroughly, and carefully remove all that swims on the surface. After it has remained half an hour in the preparation, throw the wheat into a basket that will allow the water to escape, but not the grain. It ought then to be immediately washed in rain, or pure water, which will prevent any risk of its injuring the germ, and afterwards the seed ought to be dried before it is put in the ground. It may be preserved in this shape for months.

WHEAT, To Prevent Rust in.—Some hours—at the longest six or eight before sowing—prepare a steep of three measures of powdered quicklime, and ten measures of cattle urine. Pour two quarts of this upon a peck of wheat, stir with a spade until every kernel is covered white with it. By using wheat so prepared, rust of every kind will be avoided. I have often noticed, while in the neighboring fields, a great part of the crop is affected by rust; in mine, lying closely by it, not a single ear so affected could be found.

The same writer says he takes the sheaves and beats off the ripest kernels with a stick, and uses the grain thus obtained for seed.

WHEAT, (Slugs Upon,) To Destroy.—Collect a number of lean ducks, keep them all day without food, and turn them into the field towards evening; each duck would devour the slugs much faster than a man could collect them, and they soon would get very fat for market.

WORM, (CUT) To Destroy.—The climbing cut worm is the larva of moth known as the Lance Rustic, and is quite common all over the country. If you will place old rags about the stems of young peach trees, the worms will hide under them in daytime, and can thus be caught and destroyed. A few rags, or some similar material, placed on the ground near each tree, will also answer as a trap. These traps should be examined every morning, and the worms killed. We do not know of a better method of destroying them, as the worms work all night, while their natural enemies, or a portion of them, are asleep.

WORM, CURRANT.—A multitude of devices have been tried for destroying this pest. Some persons, who have only a few bushes, succeed by hand-picking and burning; others by

dusting the leaves with lime; others by burning smudges of old leather and sulphur under the bushes; others by dusting the leaves with powdered hellebore, using for this purpose a tin box perforated at the top like a pepper-caster. The latter method has been found very successful. Another method is with a solution of copperas, made at the rate of 1 lb. of copperas to 6 gals. of water, and sprinkled on the bushes through a common watering-pot. This is cheaper than hellebore, and does not annoy the operator. It is sure and speedy death to the worm, and does no harm to the bushes. The Scotch method of treatment is with soot. When soot is dusted on the bushes after a slight shower has fallen, or after the leaves have been wetted, the vermin will soon drop off the leaves and perish. The application of a sprinkling of dry soot round the roots of bushes, when early digging operations are being proceeded with in spring, will act most successfully in preventing their appearance; and this, resorted to in successive seasons, will entirely extirpate the pests.

WORM, PEACH.—It is said that a mixture of one ounce of saltpetre and seven ounces of salt, applied on the surface of the ground, in contact and around the trunk of a peach tree seven years old and upwards, will destroy the worm, prevent the yellows, and add much to the product and quality of the fruit.

WOUNDS IN TREES, To Heal.—Make a varnish of common linseed oil, rendered very drying by boiling it for the space of an hour, with an ounce of litharge to each pound of oil, mixed with calcined bones, pulverized and sifted to the consistence of an almost liquid paste. With this paste the wounds are to be covered by means of a brush, after the bark and other substance have been pared, so as to render the whole as smooth and even as possible. This varnish must be applied in dry weather, in order that it may attach itself properly.

See also "Liquid Grafting Wax."

YAM, CHINESE.—In the first place, send off to get the tubers or seed, if you cannot obtain the roots; however, the roots are better. Cut the roots in two slices, from one-half to one inch in length, according to their size, and plant in the spring in rows two and a half feet one way by six inches apart in the row—one piece in a place, and cover three inches in depth; cultivate to keep clear of weeds, and the following spring dig up one-quarter of the bed; taking up the one-year-old roots, and cut them into pieces and plant a new bed, and thus have a supply of two-year-old roots that may be dug each fall and placed in the cellar for winter use. For cooking purposes they are excellent, apparently partaking of the general nourishing characteristics of the arrowroot as well as the potato. They will keep well, without rotting, all winter. If thought best the roots can remain in the ground all winter, and be allowed to grow three or four years, and thus grow to an enormous size. But most land without plowing for two years will get hard and full of weeds.

HOUSEHOLD MISCELLANY.

ALABASTER, To Clean.—1. Wash with soap suds. If stained, whitewash the stains; let the whitewash remain on several hours, then clean it off.—2. Take ground pumice stone of the finest quality, and mix it up with verjuice; let it stand for two hours, then dip in a sponge and rub the alabaster therewith; wash it with a linen cloth and fresh water, and dry it with clean linen rags.

BEDS, Care of.—The care of beds is not understood, even by some good housewives; when a bed is freshly made it often smells strong. Constant airing will, if the feathers are good, and only new, remove the scent. A bed in constant use should be invariably beaten and shaken up daily, to enable the feathers to renew their elasticity. It should lie, after it is shaken up, for two or three hours in a well-ventilated room. If the bed is in a room which cannot be spared so long, it should be put out to air two full days of the week. In airing beds the sun should not shine directly upon them. It is air, not heat, which they need. We have seen beds lying on a roof where the direct and reflected rays of the sun had full power, and the feathers, without doubt, were stewing, and the oil in the quill becoming rancid, so that the bed smells worse after airing than before. Always air beds in the shade on cool and windy days. Featherbeds should be opened every three or four years, the ticks washed, the seams soaped and waxed, and the feathers renovated.

Feathers were never intended for human beings to sleep on. They are always without exception debilitating. Straw, corn husks, compressed sponge, or curled hair, should always be used in preference.

BLACK LEAD, To Remove.—To remove black lead from polished steel sides of a grate, first wash them with strong soap and water, using a bit of old flannel for the purpose; then rub them with sweet oil and rotten stone; afterwards polish in the usual manner with soft leather.

BLANKETS, To Clean.—When soiled they should be washed, and not scoured, which latter they will be if sent to the scourer's. Shake all the dust from them, plunge them into plenty of hot soap-suds, let them lie till the hands can be borne in the water, wash quickly, rinse in new clean hot suds, shake thoroughly, stretch well, dry, and they will be as nice as new.

BRASS, To Clean.—Rotten stone 2 oz., oxalic acid $\frac{1}{2}$ oz., sweet oil $\frac{3}{4}$ of an oz., turpentine enough to make a paste. Apply it with a little water.

BRASS ORNAMENTS, To Clean.—Brass ornaments, that have not been gilt or lacquered, may be cleaned, and a very brilliant color given to them, by washing them with alum boiled in strong lye, in the proportion of an ounce to a pint, and afterward rubbing them with a strong tripoli.

BOARDS, To Take Ink Out of.—Strong muriatic acid, or spirits of salts, applied with a piece of cloth; afterwards well washed with water.

BOARDS, To Get Oil Off.—Mix together fuller's earth and soap lees, and rub it into the

boards. Let it dry, and then scour it off with some strong soft soap and sand, or use lees to scour it with. It should be put on hot, which may easily be done by heating the lees.

BONNETS, To Prevent Being Injured by the Hair.—Great advantage will be found in having a piece of white or yellow oiled silk basted inside of that part of your bonnet where the crown unites with the brim, carrying it up some distance into the crown, and some distance down into the hair between the outside and the lining. This will prevent the bonnet being injured by any oiliness about your hair. Or you may have an oiled silk bonnet cap.

BOOKS, To Remove Stains from.—To remove ink stains from a book, first wash the paper with warm water, using a camel's hair brush for the purpose. By this means the surface ink is got rid of; the paper must now be wet with a solution of oxalate of potash, or, better still, oxalic acid, in the proportion of one ounce to half a pint of water. The ink stains will immediately disappear. Finally, again wash the stained place with clean water, and dry it with white blotting paper.

BOOKS, To Remove Grease from.—Lay upon the spot a little magnesia or powdered prepared chalk, and under it the same; set on it a warm flat-iron, and as soon as the grease is melted it will be all absorbed, and leave the paper clean.

BOOTS AND SHOES, Care of.—Boots and shoes, if taken care of properly, will last two or three times longer than they usually do, and, at the same time, fit the feet far more satisfactorily, and keep them dry and more comfortable in wet and cold weather. The upper leather should be kept soft and pliable, while the soles need to be hard, tough, and impervious to water.

The first thing to be done with any pair of new shoes, is to set each one on a platter or a dinner-plate, and pour on boiled linseed-oil sufficient to fill the vessel to the upper edge of the soles. Allow the leather to absorb as much oil as it will for eight hours. Linseed oil should not be applied to the upper leather, as it will soon become dry, rendering the leather hard and tough. But if the soles be saturated with this oil, it will exclude the dampness and enlarge the pegs, so that the soles will never get loose from the upper leather.

If the shoes be sewed, the linseed oil will preserve the thread from rotting. Now wet the upper leather thoroughly when the boots or the shoes are to be put on the feet, so that those parts which are tight may render a trifle, and thus adapt the form of the shoe to the foot far more satisfactorily than when the upper leather is not wet. Keep them on the foot until nearly dry. Then give the upper leather a thorough greasing with equal parts of lard and tallow, or tallow and neat's foot oil.

If shoes be treated in this manner, and a row of round-headed shoe nails be driven around the edge of the soles, they will wear like copper, and always set easy to the feet. Boots and shoes should be treated as suggested, and worn

a little several months before they are put to daily service. They should be cleaned frequently, whether they are worn or not, and should never be put to stand in a damp place, nor be put too near the fire to dry. In cleaning, be careful to brush the dirt from the seams, and not to scrape in with a knife, or you will cut the stitches. Let the hard brush do its work thoroughly well, and the polish will be all the brighter. Do not put on too much blacking at a time, for if it dries before using the shining brush the leather will look brown instead of black.

BOOTS AND SHOES, India Rubber, Water Proof for.—Spermaceti, 4 parts; India rubber (small), 1 part. Melt with a gentle heat, then add tallow or lard, 10 parts; amber or copal varnish, 5 parts. Well mix and apply the composition to the leather with a paint-brush. Cut the rubber into very small pieces, and let it take its time to dissolve, say four or five hours.

BOOTS (White Jean) To Clean.—If you have not boottrees, stuff the boot as full as possible with common cotton wadding or old rags, to prevent any creases; then mix some pipeclay with water to rather a stiff paste, wash the jean boots with soap and water and a nail-brush, using as little water as possible to get the dirt off. When they look tolerably clean rub the pipeclay with a flannel well over them and hang them to dry. When dry beat out the superfluous clay with the hand and rub them till they look smooth. Flake white may also be used.

BOOTS, KID, To Clean.—If the kid boots are not very soiled they may be cleaned in the following manner:—Put half an ounce of hartshorn into a saucer, dip a bit of clean flannel in it and rub it on a piece of white card soap; rub the boots with this, and as each piece of flannel becomes soiled, take a fresh piece; the boots will look like new.

BOOTS, KID, To Restore color of.—Take a small quantity of good black ink, mix it with the white of an egg, and apply it to the boots with a soft sponge.

BOOTS, KID, To Soften.—Melt a quarter of a pound of tallow; then pour it into a jar, and add to it the same weight of olive oil, stir, and let it stand still; apply a small quantity occasionally with a piece of flannel. Should the boots be very dirty, cleanse with warm water. It will soften any leather.

BOOTS, PEGGED, To Prevent Ripping.—Pegged boots, it is stated, if occasionally dressed with petroleum between the soles and the upper leather, will not rip. If the soles of boots or shoes are dressed with petroleum they will resist wet and wear well. The pegs, it is said, are not affected by dryness after being well saturated with this liquid.

BOOTS, (PATENT LEATHER), Care of.—The old plan of washing them with milk is simply absurd—a waste of time. If they crack, brush a little blacking into the cracks, and then rub them over with French polish, or common furniture polish, using the finger to lay on the polish, and a soft dry rag to finish off with. In lieu of furniture polish, a mixture of sweet oil and turpentine will answer. This treatment will preserve their bright polish until they are utterly worn out.

BOOT LEATHER, Preservation of.—Shoe leather is generally abused. Persons know nothing or care less about the kind of material used

than they do about the polish produced. Vitriol blacking is used until every particle of the oil in the leather is destroyed. To remedy this abuse, the leather should be washed once a month with warm water, and when about half dry, a coat of oil and tallow should be applied, and the boots set aside for a day or two. This will renew the elasticity and life in the leather, and when thus used upper leather will seldom crack or break.

BOOTS AND SHOES (Summer) To Preserve through the Winter.—Wash the blacking off; let them dry; then oil them with castor or neats-foot oil. When you wear them they will be soft and pliable, and will last longer if preserved in this way. After you have worn them a few days they are ready for blacking.

BOOTS AND SHOES, (RUBBER), To Mend.—1. Get a piece of pure rubber—an old shoe—vulcanized rubber will not do; cut it into small bits. Put it into a bottle, and cover to twice its depth with spirits of turpentine or refined coal tar naphtha—not petroleum naphtha. Stop the bottle and set one side, shaking it frequently. The rubber will soon dissolve. Then take the shoe and press the rip or cut close together, and put on the rubber solution with a camel's hair brush. Continue to apply so fast as it dries until a thorough coating is formed. Spirits of turpentine dissolves the rubber slowest, but forms the most elastic cement.—2. Purchase a can of rubber cement, which can be found in large cities at rubber stores; also some rubber for patches, as new rubber is much better than old boots or shoes. To make the patches adhere, it is necessary to remove the cloth from them. To do this, moisten the cloth with benzine and remove immediately. Cut the patches the proper size to cover the hole in the boot. Make the boot around the hole rough, the size of the patch, with a wood or shoemakers file; apply the cement to the boot, and the patch with a case knife, and let them lie in a warm, dry room from thirty to sixty minutes; then put the patch on the boot, and press it down firmly. Be very particular about the edges of the patch. After it has been on a short time examine it again, to see that it has not started off; if it has, press it down again. Do not use the boot under forty-eight hours after the patch is put on. One fifty cent can of cement will last a family several years. Keep the cover on the can when not in use, as it dries up very quickly. If the cement becomes dry, cut it with benzine.

BOOTS, SQUEAKING, To Prevent.—Squeaking boots or shoes are a great annoyance, especially in entering a sick room, or a church after the service has commenced. To remedy it, boil linseed oil and saturate the soles with the same.

BOOTS AND SHOES, (Soles of) To Make Waterproof.—Experience has proved that a coat of gum copal varnish applied to the soles of boots and shoes, and repeated as it dries, until the pores are filled and the surface shines like polished mahogany, will make the soles waterproof, and also cause them to last three times as long as ordinary soles.

BOOTS AND SHOES, Water-proof composition for.—Boiled oil 1 pint; oil of turpentine, black rosin, and bees' wax, of each 3 oz. Melt the wax and rosin, then stir in the oil, remove the pot from the fire, and when it has cooled a little, add the turpentine.

BRITANIA METAL, To Clean.—Moisten the articles to be cleaned with sweet oil; then apply a little pounded rotten-stone, and polish with chamois leather and fine chalk.

BROOMS, Use and Management of.—First, buy your broom; and in buying, choose green brush. See that the broomhead will not shake in the handle; if it does, reject it; for the handle having been green when the broom was made, in sweeping the brush will keep falling out. Next, open the broom below the sewing, and see if there is any stalk. It should be all brush; for as the stalk of broom corn is brittle, if there are any below the twine, they will be continually breaking off.

Now, in using a broom, don't expect it to support you through the process of sweeping; that is how it gets its bent appearance or curl on the edge which some brooms have, and all the good that comes of it is, that you wear yourself, carpet and broom out quicker. We have seen a broom used so unskillfully, that one would almost think the person engaged in using it was endeavoring to change the place of the dust from the floor to the furniture. It requires some science, or at least some skill, to use a broom well, as it does to do anything else.

To use a broom skillfully, the handle should incline forward and not backward, as is often the case. If the top of the broom inclines forward of the part next the floor, it will prevent much of the dust from rising into the air, and will carry it along by a gentle sliding motion toward the place where it is to be disposed of.

If, on the other hand, the handle of the broom inclines backward, the dust is sent into the air by a kind of jerk, to the great annoyance of those who occupy the room, and to the great detriment of everything the apartment contains. More than this, it wears off the threads of the carpet quicker, injures the paint more, if the room is uncarpeted, and destroys the broom sooner than if the sweeping was done in a more rational way.

A new broom sweeps clean, because it is the proper shape; keep it so by sweeping on each side alternately. Wetting it before sweeping, will restore its flexibility; and if wet in boiling suds, once a week, they will become very tough, will not cut a carpet, last much longer and always sweep like a new broom. Do not keep a broom near the fire; the brush is liable to break, being so dry. Do not store brooms where there are rats or mice; they like the corn. A broom that is all out of shape, may be restored by soaking, then pressed in shape between something heavy.

CALICO, To Prevent Fading.—Put three gills of salt into four quarts of hot water, put in the calico, while the water is hot, allowing it to remain in until the water becomes cold.

CANDLE, To Make Burn All Night.—To make a candle burn all night, when, as in the case of sickness, a dull light is wished, put finely powdered salt on the candle till it reaches the black part of the wick. In this way a mild and steady light may be kept through the night by a small piece of candle.

CANDLE-STICK, (Silver-Plated) To clean.—Silver-plated candlesticks should be cleaned by pouring on the tops boiling hot water, to remove the grease; when wiped dry, use whiting, rubbing them until bright. This will not injure the plated ware.

CARPETS, To Choose.—The carpet ought to assimilate with the style of the paperhangings, but the quality of the material must depend on the capability of the purchaser's pocket. In carpets, as in many other things, the dearest articles are generally the cheapest in the end. In illustration of this we may state that the carpet in our dining-room cost \$1.25 a yard, and although it has been in daily use for four years it looks as well as ever. For dining and drawing rooms Brussels carpets are the best. If the rooms are small choose small patterns with few colors, or of a pattern formed of shades of the same color as the ground, such as a green carpet with mosses or small ferns in various shades of green, or a carpet with an indistinct pattern of ribbons or arabesques of a small size. When there is nothing very decided to attract the eye, the defects of wear are not so obvious. Stair carpets are also best of Brussels make; crimson wears longest; they must be of a pattern that will admit of being turned upside down, as it is a good plan frequently to change the position of the carpet, that the edge of each step may not always come in the same spot, which would soon wear the fabric. A small gay pattern of crimsons or oak colors wears best; avoid blues or lilacs or shades of stone color: the two former fade quickly, and the latter always looks dirty.

CARPETING, CHEAP.—Sew together strips of the cheapest cotton cloth, of the size of the room, and tack the edges to the floor. Then paper the cloth as you would the sides of a room, with any sort of room paper. After being well dried, give it two coats of varnish, and your carpet is finished. It can be washed like carpets without injury, retains its gloss, and, on chambers or sleeping-rooms, where it will not meet rough usage, will last for two years, as good as new.

CARPETS, How To Lay.—Cover the floor with thick brown paper, which is sold in large rolls for the purpose; have the carpet properly fitted, and, on the binding of the edges, sew at regular distances small brass rings in such a manner that when the carpet is laid they will not appear beyond the edges. Round the sides of the room drive medium-sized brass-headed nails, at the same distances from each other as the rings are sewed on the carpet; when ready, begin at the top of the room and hook the rings over the brass-headed nails, which must be driven into the floor far enough to admit of the rings catching a firm hold. When the top is hooked on, stretch the carpet to the opposite side and hook it on, then fasten the sides in like manner. This is much less troublesome and is more economical than nailing down carpets.

CARPETS (STAIR), To make last.—Slips of paper should always be placed over the edges of the stairs, under the carpet. This will diminish the friction between the carpet and the boards underneath it. The strips should be in length within an inch or two of the width of the carpet, and four or five inches in breadth, as convenient. This simple expedient will preserve the carpet half as long again as it would last without the strips.

CARPETS, To Sweep.—Sweeping carpets too often wears them out rapidly. It is obvious to any one, that a brisk, daily brushing over the whole surface must wear away and carry off more woolly particles than the occasional stepping of

feet during the day without the rubbing and scraping given by the broom. To allow sand and grit to accumulate on the surface, and to become ground into the fibres by the pressure of sole leather is, however, worse than sweeping. A handful or so of salt sprinkled on the carpet will carry the dust along with it and make the carpet look bright and clean. A very dusty carpet may be cleaned by setting a pail of cold water out by the door, wet the broom in it, knock it to get off all the drops, sweep a yard or so, then wash the broom as before and sweep again, being careful to shake all the drops off the broom, and not sweep far at a time. If done with care it will clean a carpet very nicely and you will be surprised at the quantity of dirt in the water. The water may need changing once or twice, if the carpet is very dirty. Snow sprinkled over a carpet and swept off before it has time to melt and dissolve, is also nice for renovating a soiled carpet. Moistened Indian meal is used with good effect by some housekeepers.

In libraries, cabinets, etc., where dust might badly injure or wholly spoil the specimens and books, it is better to procure a patent carpet sweeper, merely using the broom or brush to clean out the corners and sides.

CARPETS, To Clean.—Brussels carpets may be cleaned as follows:—Take them up and shake and beat them, so as to render them perfectly free from dust. Have the floor thoroughly scoured and dry, and nail the carpet firmly down upon it. If still much soiled, it may be cleaned in the following manner:—Take a pailful of clean cold spring water, and put into it about 3 gills of ox-gall. Take another pail with clean cold water only. Now rub with a soft scrubbing brush some of the ox-gall water on the carpet, which will raise a lather. When a convenient sized portion is done, wash the lather off with a clean linen cloth dipped in the clean water. Let this water be changed frequently. When all the lather has disappeared, rub the part with a clean dry cloth. After all is done, open the window to allow the carpet to dry. A carpet treated in this manner will be greatly refreshed in color, particularly the greens.—In nailing down a carpet after the floor has been washed, be certain that the floor is quite dry, or the nails will rust and injure the carpet. Fuller's earth is used for cleaning carpets, and weak solutions of alum or soda are used for reviving the colors. The crumb of a hot wheaten loaf rubbed over a carpet has been found effective.

CARPETS, To Remove Grease from.—1. Mix a little soap into a gallon of warm soft water, then add half an ounce of borax; wash the part well with clean cloth, and the grease or dirty spot will soon disappear.—2. Cover the grease spot with whiting, and let it remain until it becomes saturated with the grease; then scrape it off, and cover it with another coat of whiting, and if this does not remove the grease, repeat the application. Three coats of whiting will, in most cases, remove the grease, when it should be brushed off with a clothes brush. If oil has been spilt on a carpet, that part of the carpet must be loosened up, and the floor beneath it well scrubbed with warm soap and water, and fuller's earth; otherwise the grease will continue yet to be through.—3. To remove spots of spermaceti scrape off as much as you can with a knife, lay on a thin, soft, white paper upon the

spots, and press it with a warm iron. By repeating this you may draw out the spermaceti. Afterward rub the cloth where the spots have been, with some very soft brownish paper.

CARPETS, To Prevent Moths in.—To prevent moths from injuring carpets, buy half a pound of gum camphor, and that will save all the carpets in your house for a year, by placing a few little crumbs under the edges of the carpets without moving them.

CASKS, (WATER) To Clean.—Scour the inside well out with water and sand, and afterward apply a quantity of charcoal dust; another and a better method is to rinse them with a strong solution of oil of vitriol and water, which entirely deprives them of their foulness.

CHAIRS (Cane-Bottom) To Clean.—Turn up the chair bottom, etc. and with hot water and a sponge wash the cane-work well, so that it may become completely soaked. Should it be very dirty you must add soap. Let it dry in the open air, if possible, or in a place where there is a thorough draught, and it will become as tight and firm as when new, providing that it has not been broken.

CHIMNEYS, Leaks Around.—These may be stopped by applying a paste made of tar, and dry, sifted road dust. The paste should be lapped over the shingles to form a collar.

CHINA OR GLASSWARE, To Mend.—A useful cement is produced by powdered chalk and white of egg. A mixture of equal parts of white of egg, white-lead, and glue, forms a strong cement. Or take a very thick solution of gum arabic in water, and stir into it plaster of Paris until the mixture becomes a viscous paste. Apply it with a brush to the fractured edges, and stick them together. In three days the article cannot again be broken in the same place. For other preparations for this purpose see "Cements".

CHILDREN, To Protect From Burning.—Add one ounce of alum to the last water used in rinsing children's dresses, and they will be rendered unflammable. It would be better still to dress them in woollen materials during the season when fires are needed.

CLINKERS.—Oyster shells on top of a coal fire will cause the clinkers adhering to the sides of the grate or to the fire-brick to drop off. Be liberal with your oyster shells and you will have no trouble with clinkers.

COLOR, To Restore.—It is well known that when the color on a fabric has been destroyed by acid, ammonia is applied to neutralize the same. But it is not so well known that after the application of ammonia, chloroform will, in almost all cases, restore the original color. Chloroform will also remove paint from a garment when almost everything else fails.

CROCKERY WARE, To Mend.—Wash the vessel gently and thoroughly with soap and water, and let it dry without wiping. The pieces should then be fitted together as soon as possible, and kept in their places by winding firmly over the bowl or dish a strong thread, or a piece of twine; put the broken article into a boiler, an inch or two larger each way, and fill them both with sweet, cold, skimmed milk; set the boiler over the fire, and boil for ten or fifteen minutes; take it off, and let it stand till quite cold, when the string, or twine, may be cut, and the article washed in warm water.

CURTAINS, WINDOW.—Window curtains are alike useful and ornamental. They ought to be chosen of a color harmonizing with the carpet, paperhangings, and other drapery of the apartment. As a rule, red or green curtains will blend pleasantly with ordinary drapery. Window curtains are composed of satin, silk, rep, damask, moreen, calico, and other fabrics. Rep is very durable, but damask, which may be periodically refreshed by the dyer, is the most economical and useful. Net and muslin curtains should be substituted or added during the summer months. Top valances have been dispensed with as collecting dust and obscuring the light; and the curtains are now suspended by large rings on brass or mahogany rods, having ornamental terminals. Window curtains are seldom drawn, their principal use being to conceal the window-shutters, intercept draughts from the window-sashes, and impart a comfortable aspect to the apartment.

DISHES, How To Wash.—First make sure before breakfast or dinner that there is plenty of water in the boiler, and also in the tea-kettle. After the table is cleared, the tablecloth brushed off and neatly folded away, and the dining-room disposed of, proceed with your dishes. First take a large dish-pan, put into it a piece of soap, and pour over the soap three or four dipperfuls of hot water from the boiler. Then add 2 or 3 dipperfuls of cold soft water. Then the dish-cloth. The water should now be so cool as not to turn the hands red when put into it. Take the dish-cloth and rub from the soap the melted surface, and put the remainder away. Wash a dish at a time and pass it to another pan. When all are done, or the pan is full, take the tea-kettle and pour over enough hot water to thoroughly rinse and heat them. Now take them from the water, one at a time, and place them bottom-side up upon a tray or pan to drain. If they have been properly washed, this hot rinsing water will run off or evaporate in a minute, leaving the dishes nearly dry. However, they should now be wiped with a clean, dry towel, and put away. Dishes must be washed in soft water. Especially is this necessary where soap is used. And soap is really indispensable in washing dishes properly. The dishes should be scraped free from grease, crumbs, bones, etc., before commencing to wash them. A neat house-keeper will have the same dish-cloth in use until it is worn out, when it should be put into the ragbag. Never allow the dish-cloth to be used for any thing else but washing dishes.

DISH FOR DISHWASHING, How To Make.—A handy dish for this purpose can be secured by making it, oval, in shape, 20 inches by 12 inches at the bottom 24 inches by 16 inches at the top and 6 inches deep; 11 inches from one end there is a tin partition, dividing the pan into two compartments, the smaller for washing, the larger for rinsing the dishes in hot water.

DOORS, To Prevent Creaking.—Apply a little soap to the hinges. Or take lard, soap, and black lead, equal parts, mix and apply.

EARTHENWARE, To Temper.—When new, and before used for baking, put in cold water to cover, and heat it gradually until the water boils. It is then less likely to crack.

FEATHERS, To Clean.—Feathers are commonly cleaned by washing them in a weak solution of carbonate of soda or in lime water,

after which they are rinsed in clean water, and then dried in the sun or in a stove. They will now be improved by a thorough beating. The best way to clean feathers, is to clean them out of the house, by taking them up on the roof of the house, barn, or shed, selecting a windy day, carefully ripping the tick the whole length of the seam, and suddenly opening it widely, so that the wind will clean them out in every direction.—Don't sleep on feathers they are an utter abomination and are the cause of a vast amount of weakness, being as they are prime extractors of vital force.

FIRES OF KEROSENE, To Extinguish.

—In cases of kerosene fires, don't try to extinguish the flame with water; that will only spread the fire. Instead, use blankets, or woollen clothes, quilts, shawls, or whatever may be at hand that can be used to smother the flames.

FIREBOARD OF PAPER FLOWERS.

—Take a piece of board which fits exactly into the space. Tack over it a cover of green baize, stretching it smoothly. Make out of stiff, green paper a number of leaves, dahlia, rose, tulip, lily, etc., enough of them to entirely cover the baize. Baste these leaves down at the stem; curl them at the edges with the scissors, and gum them down in the baize. Do not sew them, except at the stem. Now make large paper flowers, or, if you have them, take artificial flowers, and smooth them over. Place the flowers amid the leaves, using your own taste in the arrangement. Sew the flowers at the stem; or, if you wish to fasten the flowers themselves down, use dissolved gum Arabic.

FLOORS, Mopping and Cleaning.—The practice of mopping floors too often, is a loss of time, and a waste of strength, and is inconsistent with reason, as the habit of blacking cooking stoves every time they are used; and I am not sure but wet floors are as detrimental to health as the dust sent forth by the too frequent use of the common stove blacking. Mopping painted floors too often, and with hot soapsuds, wears off the paint, causing needless expense of both time and money.

It is difficult to say, how often a painted, or an unpainted floor should be washed, for that depends on circumstances; but it requires that the cloth, mop and water, should be as clean as a supply of the latter will admit, and the floor wiped as dry as possible; and that every corner, and other retired spots, under beds, bureaus, or any other articles which may be in the apartments, should have a fair chance to partake of the cleansing.

FLOORS, To Scour.—Take some clean, well-sifted sand, scatter it on the floor, have ready one ounce potash dissolved in a pint of water, sprinkle it over the sand, and with a scrubbing-brush and good mottled soap rub the boards along their length. Changing the water frequently and using it very hot, makes the boards white; the potash, if properly applied, will remove all stains.

FLOORS, To Remove Stains from.—For removing spots of grease from boards, take equal parts of fullers' earth and pearlash, a quarter of a pound of each, and boil in a quart of soft water; and, while hot, lay it on the greased parts, allowing it to remain on them for ten or twelve hours; after which it may be scoured off with sand and water. A floor much spotted with

grease should be completely washed over with this mixture the day before it is scoured. Fullers' earth or ox-gall, boiled together, form a very powerful cleansing mixture for floors or carpets. Stains of ink are removed by strong vinegar, or salts of lemon will remove them.

FRAMES (Gilt), To Revive.—White of eggs, 2 oz.; chloride of potash or soda, 1 oz.; mix well, blow off the dust from the frames; then go over them with a soft brush dipped in the mixture, and they will appear equal to new.

FRAMES (Picture) To Prevent Flies soiling.—To prevent the flies going on picture frames and furniture, immerse a quantity of leeks for five or six days in a pail of water, and wash the pictures, etc., with it.

FURNITURE, Care of.—Keep the paste or oil in a proper can or jar, that there may be no danger of upsetting when using it. Have two pieces of woollen cloth, one for rubbing it on, the other for rubbing it dry and polishing; also an old linen cloth to finish with, and a piece of smooth soft cork to rub out the stain. Use a brush if the paste be hard. Always dust the table well before the oil or paste is put on; and, if it should be stained, rub it with a damp sponge, and then with a dry cloth. If the stain does not disappear, rub it well with a cork or a brush the way the wood grows; for if rubbed cross-grained it will be sure to scratch it. Be careful to keep the cork and brush free from dust and dirt. When the dust is cleaned off and the stains have been got out, put on the oil or paste, but not too much at a time; rub it well into the wood. If oil, be as quick as possible in rubbing it over the table, and then polish it with another woollen cloth. If wax, put a little bit on the woollen cloth, with the finger or a small stick; rub it well with this till the table has a high polish, then have another cloth to finish it with. Be very careful to have the edges of the table well cleaned, and the oil and wax well rubbed off.

The furniture which is not in constant use will not require to be oiled above once a week; it ought, however, to be dusted every day and well rubbed. Tables which are used daily must be well rubbed every morning, and great care should be taken to remove all spots from them, particularly ink. This can very easily be done, if not left to dry long, by putting on a little salt of lemons with the finger.

When cleaning tables or chairs, be careful to remove them into the middle of the room, or at a distance from the wall. If the sideboard or sidetable is fixed to the wall, be still more careful in cleaning it, and roll up the woollen cloth tight in the hand, and into a small compass.

FURNITURE, To Take Bruises Out of.—Wet the part with warm water; double a piece of brown paper five or six times, soak it in the warm water, and lay it on the place; apply on that a warm, but not hot flat-iron till the moisture is evaporated. If the bruise be not gone, repeat the process. After two or three applications, the dent or bruise will be raised to the surface. If the bruise be small, merely soak it with warm water, and hold a red-hot iron near the surface, keeping the surface continually wet—the bruise will soon disappear.

GLASSWARE (New) To Season.—Put dishes, tumblers, and other glass articles into a kettle; cover them entirely with cold water, and put the kettle where it will soon boil. When it

has boiled a few minutes, set it aside, covered close. When the water is cold, take out the glass.

GLASS-CLEANING.—Glass windows, looking-glasses, etc., may be cleaned as follows:—Dip a moistened rag or flannel into indigo, fuller's earth, ashes, or rotten-stone, in impalpable powder, with which smear the glass, and wipe it off with a dry soft cloth. Powder-blue or whiteness, tied up in muslin and dusted upon the glass, and cleaned off with chamois-leather, also gives glass a fine polish. The spots in the silvering of old looking-glasses are caused by damp at the back.

GLASS CHIMNEYS, To Prevent cracking.—If the chimney-glass of a lamp be cut with a diamond on the convex side, it will never crack, as the incision affords room for the expansion produced by the heat, and the glass, after it is cool, returns to its original shape, with only a scratch visible where the cut is made.

GLASS-GLOBES, To Clean.—If the globes are much stained on the outside by smoke, soak them in tolerably hot water with a little washing soda dissolved in it, then put a teaspoonful of powdered ammonia into a pan of lukewarm water, and with a tolerably hard brush wash the globes till the smoke stain disappears; rinse in clean cold water, and let them drain till dry; they will be quite as white and clear as new globes.

GREASE, To Remove from STONE STEPS Or Passages.—Pour strong soda and water boiling hot over the spot, lay on it a little fuller's-earth made into a thin paste with boiling water, let it remain all night, and if the grease be not removed, repeat the process. Grease is sometimes taken out by rubbing the spot with a hard stone (not hearthstone), using sand and very hot water with soap and soda.

GRAINING, How To Wash.—Take clear warm water, a clean, white cloth, and wash a small place and wipe dry with another clean, white cloth. Do not wet any more space than you can dry immediately with your cloth as it must not be left to dry in the atmosphere; it must be rubbed dry, hence the necessity for clean white cloths. If the paint has been neglected until very much soiled with greasy fingers, or specked with a summer's growth of flies, a very little hard soap may be put in the first water, and then rinsed off with clear water, but avoid soap if you possibly can, as it dulls the varnish, however carefully used. On no account must it be rubbed on with a cloth.

HOUSE CLEANING.—In cleaning a room, the carpet should come up first, not only because of the dust, but to give the floor all day to dry, not leaving it to be scrubbed last, as we have seen some bad managers do, and pay for it by influenzas. Where the walls are papered, they should next be swept with a clean towel pinned firmly round a broom, if there is not a brush kept for the purpose. The ceilings of chambers are usually whitewashed; this is the next proceeding; and the walls scrubbed, if painted or hard finished. Then come windows and wood-work, in all things being careful to use as little slop as will thoroughly answer the purpose. In cleaning wood-work, use little soap, but plenty of clean water, which will prevent discoloration. If dirty spots and patches are wiped off the year round, faithfully, there will be much less need of scrubbing the boards bare in "house cleaning". Oak, or dark woods, now so much the fashion,

need not be touched, with good care, more than once a year; frequent dry rubbing will answer every purpose.

HOUSE, How To Choose In Renting.—The choice of a house is in importance second only to the selection of a friend. The best residence is one which is not inconveniently distant from your place of business—is in a cheerful and healthy locality, and of which the rent, including rates and taxes, does not exceed one-sixth of your income. Do not choose a neighborhood merely because it is fashionable, and carefully avoid occupying a dwelling in a locality of doubtful reputation. Be particular as to whether it is dry, with convenient sewage and plenty of water. A southern or western aspect is to be preferred. Should the house be infested with vermin, avoid it. See that the windows and doors are well secured, that there are proper means of ventilation, and that the chimneys do not smoke.

Let all needful repairs be made by the landlord before the completion of your agreement, otherwise you will probably be required to execute them at your own expense. Do not deal with a landlord who is commonly reputed as being disobliging, greedy, or litigious. In every case have a lease properly drawn out and stamped.

Avoid the neighborhood of a sluggish stream, a mill-dam, or fresh-water lake. The penalties are rheumatism, ague, impaired eyesight, loss of appetite, asthma and other distressing ailments. Choose a house away from the vicinity of tan-yards, and tallow, soap, and chemical works. The neighborhood of old and crowded burial-grounds and of slaughterhouses is to be shunned. A low situation is perilous, especially, during the prevalence of epidemics.

Never lease a house in a narrow street, unless the back premises are open and extensive. Before closing your bargain try to obtain some account of the house from a former occupant.

HOUSE, How To Furnish a.—If you are about to furnish a house, do not spend all your money, be it much or little. Do not let the beauty of this thing, and the cheapness of that, tempt you to buy unnecessary articles. Doctor Franklin's maxim was a wise one—"Nothing is cheap that we do not want." Buy merely enough to get along with at first. It is only by experience that you can tell what will be the wants of your family. If you spend all your money, you will find you have purchased many things you do not want, and have no means left to get many things which you do want. If you have enough, and more than enough, to get everything suitable to your situation, do not think you must spend it all, merely because you happen to have it. Begin humbly. As riches increase, it is easy and pleasant to increase in comforts; but it is always painful and inconvenient to decrease. After all, these things are viewed in their proper light by the truly judicious and respectable. Neatness, tastefulness, and good sense may be shown in the management of a small household, and the arrangement of a little furniture, as well as upon a larger scale; and these qualities are always praised, and always treated with respect and attention. The consideration which many purchase by living beyond their income, and, of course, living upon others, is not worth the trouble it costs. The glare there is about this false and wicked parade is deceptive; it does not

in fact, procure a man valuable friends, or extensive influence.

HOUSE, How To Choose in Purchasing.—In purchasing a house, whether old or new, do not trust to appearances, or rely on your own judgment. When you have selected a house likely to suit your family and your purse, employ a surveyor to inspect every portion of it. He will examine the foundations, the state of the sewage, and the character of the materials which form the walls. He will be able to detect if soft bricks have been used, by finding traces of damp at the bottom of the walls. In examining the joists, flooring, and other woodwork, he will be enabled to report whether cheap wood has been used instead of well-seasoned timber. By your solicitor you must look into the nature of the tenure and the duration of the building lease. If you can obtain a freehold property, so much the better; if not, be particular in considering whether the ground-rent is such as to justify the purchase. You will do well to secure a portion of ground beside your house, on which you might erect an addition should your family increase; or your business demand further accommodation. Beware of rashly purchasing fixtures,—such as window-blinds, hall carpets, and kitchen furnishings; new articles may be found in the end more economical. Make an effort to pay the whole of the purchase-money. A bond on your house will endanger your credit, and affect your comfort.

HOUSE PLANTS, To Keep Without Fire.—Take an old bed quilt, put it on the floor, and set the plants together in the center. Set a stand over them, and bring the quilt up over the top. If any of the plants are very sensitive to the cold, a newspaper pinned around them would be an additional protection.

ICE-HOUSE, Extemporaneous.—An ice-house can be extemporised without making a tenon or sawing a board. Construct a pen near the pond or stream where the ice is to be gathered, choosing if possible a gravel-bank where there will be good drainage. The pen may be made of rails twelve feet long, or of any desired length. The larger the pen, the better the ice will keep. Lay up two rails upon each of the four sides. Make the bottom level, and cover it a foot or more with straw, sea-weed, or any convenient refuse vegetable matter. Sawdust is better than straw, if it can be had. Spent tan-bark is a good material for this foundation. Cut the cakes of ice in the usual manner, and pack them closely, filling the interstices with pounded ice, and if the weather is freezing pour on a little water to make it solid. Pack the outside with a foot of straw, sawdust, or other material, and put up the fence as the pile of ice rises. The pile can be conveniently made about eight feet high. Cover the top with at least eighteen inches of sawdust, or two feet of straw trodden down closely. Make a roof of boards or slabs slanting to the north, sufficiently steep to shed water, and fasten with a few nails. Such a pile of ice as this can be secured by a couple of men and a team in a day. A cheap ice-box made with double sides and packed with sawdust will be wanted. The inner chamber should be about 2 feet long, 2 feet deep, and 18 inches wide. This will hold a single cake of ice weighing a hundred pounds or more, and leave room on top to keep milk, fresh meats, fruit, and other matters. X

will last from four days to a week, according to the quantity that is used in the drinking-water. If the extemporaneous ice-house is not disturbed more than once a week, it will probably supply the family through the summer with abundance of ice.

INK STAINS, To Remove From Books.—To remove ink stains from a book, first wash the paper with warm water, using a camel's hair pencil for the purpose. By this means the surface ink is got rid of; the paper must now be wetted with a solution of oxalate of potash, or, better still, oxalic acid, in the proportion of one ounce to half a pint of water. The ink stains will immediately disappear. Finally, again wash the stained place with clean water, and dry it with white blotting paper.

INK, To Remove From DRESS GOODS.—Oxalic acid is considered one of the best agents for this purpose. Dissolve ten cents worth in a pint of soft water; dip the stained spots in it quickly, and then into clear water, and rub well; repeat the process until the stains are removed. If the goods remain in the acid, the texture will be destroyed. The skin of the hands is unpleasantly affected, if brought into frequent contact with a strong solution; care should be taken to dip only the spots into this liquid. If the color of the dress is affected mix with warm water and wet with a dilute solution of ammonia which will restore the original color. Ink stains on table covers can be removed in the same way.

INK STAINS, To Remove From Linen.—With a clean rag or sponge rub the soiled spot with lemon juice in which has been dissolved a small quantity of salt.

INK, To Extract From Mahogany.—Dilute half a tea-spoonful of oil of vitriol with a large spoonful of water, and apply the mixture with a feather to the stained wood. The ink mark will disappear.

INK (Marking), To Remove.—Wet the stain with fresh solution of chloride of lime: and, after ten or twelve minutes, if the marks have become white, dip the part in solution of ammonia (the liquid ammonia of chemists), or hyposulphate of soda. In a few minutes, wash in clean water.

IRON MOULDS, To Remove.—Rub on the spot a little powdered oxalic acid, or salts of lemon and warm water, let it remain a few minutes and well rinse in clean water.

IRON MOULD (Old), To Remove.—The part stained should be remoistened with ink, and this removed by the use of muriatic acid diluted with five or six times its weight of water, when it will be found that the old and new stain will be removed simultaneously.

IRON RUST, To Remove.—Every particle of rust on iron may be removed by first softening it with petroleum, and then rubbing well with coarse sand-paper. To paint iron, take lamp-black sufficient for two coats, and mix with equal quantities of Japan varnish and boiled linseed oil.

IVORY, To Whiten.—1. When ivory ornaments get yellow or dusky looking, wash them well in soap and water, with a small brush to clean the carvings, and place them while wet in full sunshine; wet them for two or three days, several times a day, with soapy water, still keeping them in the sun; then wash them again, and they will be beautifully white.—2. Immerse the ivory in a saturated solution of alum and allow it to soften in it for an hour; then take it out,

rub with a woolen cloth, wrap in a piece of linen to dry throughout, and polish afterward.—3. The ivory is heated in a thin paste of lime until it turns white, it is then dried and polished.

IVORY, To Take Stains Out of.—A little prepared white chalk, tinged with sweet oil and sal volatile into a paste; rub it on wet with a piece of wash-leather; let it remain until dry, then brush it off.

FIRE KINDLINGS.—Take one quart tar, three pounds rosin; melt them; when somewhat cool add one gill spirits turpentine, and mix as much sawdust, with a little charcoal, as can be worked in; spread out while hot on a board; when cold break up in small lumps about the size of hickory nuts. They will easily ignite with a match and burn with a strong blaze long enough to burn any wood fit to burn.

KNIVES, To Clean.—1. Cut a good-sized solid, raw potato in two; dip the flat surface in powdered brick-dust, and rub the knife-blades. Stains and rust will disappear.—2. One of the best substances for cleaning knives and forks is charcoal, reduced to a fine powder, and applied in the same manner as brick dust is used.—3. Water lime is also used for this purpose. Have a box with a partition and keep the lime in one part and the cloths in the other. Wet a small cloth a little and dip it in the lime, and after the articles are well washed and wiped, rub them until the spots are removed. Then take a larger, dry cloth, dip it in the lime, and rub the articles until polished to suit. Wipe off the dust from the knives and forks with a dry cloth, and they are ready to put away.

KNIVES, To Preserve From Rust.—Never wrap them in woolen cloths. When they are not to be used for some time, have them made bright and perfectly dry; then take a soft rag, and rub each blade with dry wood ashes.—Wrap them closely in thick brown paper, and lay them in a drawer or dry closet. A set of elegant knives, used only on great occasions, were kept in this way for over a hundred years without a spot of rust.

IVORY KNIFE HANDLES, To Prevent Being Cracked.—Never let knife-blades stand in hot water, as is sometimes done to make them wash easily. The heat expands the steel which runs up into the handle a very little, and this cracks the ivory. Knife-handles should never lie in water. A handsome knife, or one used for cooking, is soon spoiled in this way.

KNIFE HANDLES, (Loose) To Fasten.—The best cement for this purpose consists of one pound of colophony (purchasable at the druggist's) and eight ounces of sulphur, which are to be melted together, and either kept in bars or reduced to powder. One part of the powder is to be mixed with half a part of iron filings, fine sand or brick dust, and the cavity of the handle is then to be filled with this mixture. The stem of the knife or fork is then firmly inserted and kept in position until the cement hardens.

LACQUERED ARTICLES, To Clean.—Brush with hot water and soap, wipe and dry before the fire; finish with a soft cloth. Avoid the use of pearlsh or soda which may remove the lacquer.

LAMP ACCIDENT, To Prevent.—Scarcely a week passes, during the winter months, but we read accounts of frightful accidents from kerosene lamps exploding and killing or scarring for

life, women and children. A simple knowledge of the inflammable nature of the fluid, would probably put a stop to nearly all the accidents. As the oil burns down into the lamp, or highly inflammable gas gathers over its surface, and as the oil decreases, the gas increases. When the oil is nearly consumed a slight jar will often inflame the gas, and an explosion is sure to follow, dealing with death and destruction. A bombshell is not more to be dreaded. Now if the lamp is not allowed to burn more than half way down, such accidents are almost impossible. Always fill your lamps in the morning; then you never need fear an explosion.

The charred wick should also be cut off, for observation shows that in a few times using the wick becomes charred, and after the lamp has burned a little time the tube becomes overheated, and the charred wick is all on fire. From this extra heat the oil is set on fire, and then comes an explosion. Cut off the charred wick daily.

It would seem as though no one need be told that it is dangerous to use any burning oil for the purpose of kindling a fire, but the frequent record of deaths from that practice, shows that great numbers follow that wasteful and dangerous way.

LAMPS, (Kerosene) Turning Down The Wicks Of.—Many people who use kerosene oil are in the habit of burning night-lamps, and turning them down as they would gas, not knowing how much mischief they thus do. When the light of the kerosene lamp is turned down low, the combustion is not perfect, and the atmosphere of the room becomes vitiated by the unconsumed oil vapor, by the gas produced by combustion, and also legitimate particles of smoke and soot thrown off, to be taken into the lungs of the occupants. Air thus poisoned is deadly in its effects, and the wonder is that the people are not immediately and fatally injured by breathing it. Its consequences are the unaccountable and mysterious headaches, irritation of throat and lungs, dizziness and nausea.

LAMPS, To Clean.—Bronzed lamps should be wiped carefully; if oil be frequently spilled over them, it will cause the bronzing to be rubbed off sooner than it would disappear by wear. Brass lamps are best cleaned with crocus, or rotten stone and sweet oil. Lacquered lamps may be washed with soap and water, but should not be touched with acid or very strong lye, else the lacquer will soon come off. When lamps are foul inside, wash them with potash and water, rinse them well; set them before the fire, and be sure that they are dry before oil is again put into them.

LAMP CHIMNEYS, To Clean.—Most people cleaning lamp chimneys, use either a brush made of bristles twisted into a wire, or a rag on the point of scissors. Both of these are bad; for, without great care, the wire, or scissors will scratch the glass as a diamond does, which under the expansive power of heat, soon breaks, as all scratched glass will. If you want a neat thing that costs nothing, and will save half your glass, tie a piece of soft sponge the size of your chimney to a pine stick.

LAMP CHIMNEYS, To Prevent Breaking.—To prevent lamp glasses breaking by the sudden contact with heat, the best way is to cut or scratch the base of the glass with a glazier's diamond. Another method is to put the glasses

into a saucepan of water and boil them. This seasons them.

LAMPS, To Prevent Smoking.—Soak the wick in strong vinegar, and dry it well before you use it; it will then burn both sweet and pleasant, and give much satisfaction for the trifling trouble taken in preparing it.

LAMP WICKS, Home Made.—A good substitute for a regular lamp-wick may be made of cotton flannel, taking a strip three times as wide as the lamptube, and folding it, overcasting the open edge. The little bits can thus be utilized, and many times considerable annoyance saved by having a supply of these needed articles always in the house.

LEAK, To Stop a.—Beat yellow soap and whiting, with a little water, into a thick paste. Rub this over the part where the leakage is and it will be instantly stopped.

LEATHER (BLOCK) OF OLD FURNITURE, To Restore.—Eggs, yolk and white well beaten, 6 parts; treacle, 1 part; isinglass, 1 part; water, 5 parts. Dissolve the isinglass in the water, then add it to the other articles. Mix well. Color with lampblack. This also forms a good varnish for dress shoes.

LINEN, Care Of.—When linen is well dried and laid by for use, nothing more is necessary than to secure it from damp and insects. The latter may be agreeably performed by a judicious mixture of aromatic shrubs and flowers, cut up and sewed up in silken bags, to be interspersed among the drawers and shelves. These ingredients may consist of lavender, thyme, roses, cedar shavings, powdered sassafras, cassia lignea, &c., into which a few drops of otto of roses, or other strong-scented perfume, may be thrown. In all cases, it will be found more consistent with economy to examine and repair all washable articles, more especially linen, that may stand in need of it, previous to sending them to the laundry. It will also be prudent to have every article carefully numbered, and so arranged, after washing, as to have their regular turn and term in domestic use.

LINEN, To Remove Fruit Stains in.—To remove them, rub the part on each side with yellow soap, then tie up a piece of pearl-ash in the cloth, &c., and soak well in hot water, or boil; afterwards expose the stained part to the sun and air until removed.

LINEN, To Take Ink Out Of.—Ink spots may be effectually removed from linen by a simple and ready process. Take a piece of tallow, melt it, and dip the spotted part of the linen into the tallow; the linen may be washed and the spot will disappear, the linen remaining uninjured.

LINEN, To Take Marking Ink Out Of.—A saturated solution of cyanuret of potassium, applied with a camel's-hair brush. After the marking ink disappears, the linen should be well washed in cold water.

LINEN, To Remove Mould From.—Spots of mould on fabrics can, it is said, be removed from cotton or linen, by first rubbing them over with butter and afterwards applying potassa moistened with a little water, and then rubbing the spot, when all traces of it will disappear.

LINEN, To Remove Stains From.—Stains caused by acids can be removed by wetting the part and laying it on some salt of wormwood; then rub it without diluting it with more water. Or, tie up in stained part some perlash; then

scrape some soap into cold soft water, to make a lather, and boil the linen till the stain disappears. Recent stains of fruit may be removed by holding the linen tightly stretched over a tub and pouring hot water over the part. This must be done before any soap has been applied to it. As soon as the stain is made on table linen, etc., rub on it common table salt, before it has had time to dry; the salt will keep it damp till the cloth is washed, when the stain will disappear; or, wash the stain lightly when the cloth is removed.

LINEN, To Make FIRE PROOF.—A quantity of phosphoric acid lime is dissolved in water; to this a little ammonia is added and the whole filtered and discolored with animal carbon. It is then put on the fire and left to evaporate until it is concentrated, when gelatine and five per cent. silicic acid is added, and again reduced by evaporation to a crystalline substance, which is dried and pulverized. This powder is called "Hottina", from the name of the inventor. The cloth to be made fire-proof is dipped in a solution made of thirty per cent. of the above powder, thirty-five per cent. of gum, and thirty-five per cent. of starch. The cloth, when dry, will be perfectly fire-proof, and preserve its color.

LINEN (SCORCHED) To Restore.—Take two onions, peel and skin them, and extract the juice by squeezing or pounding. Then cut up half an ounce of white soap, and two ounces of fuller's earth; mix with them the onion juice, and half a pint of vinegar. Boil the composition well, and spread it when cool over the scorched part of the linen, leaving it to dry thereon. Afterward wash out the linen.

LOOKING GLASSES, To Clean.—Take a newspaper, or part of one, according to the size of the glass. Fold it small, and dip it into a basin of clean cold water; when thoroughly wet, squeeze it out in your hand as you would a sponge, and then rub it hard all over the face of the glass, taking care that it is not so wet as to run down in streams. In fact, the paper must only be completely moistened, or damped all through. After the glass has been well rubbed with a wet paper, let it rest a few minutes, and then go over it with a fresh dry newspaper (folded small in your hand), till it looks clear and bright—which it will almost immediately, and with no further trouble.

This method, simple as it is, is the best and most expeditious for cleaning mirrors, and it will be found so on trial—giving it a clearness and polish that can be produced by no other process. It is equally convenient, speedy, and effective. The inside of window frames may be cleaned in this manner to look beautifully clear; the windows being first washed on the outside.

MAHOGANY FURNITURE, To Give a Good Color to.—Let the tables be washed perfectly clean with vinegar, having first taken out any ink-stains there may be, with spirits of salt. Use the following liquid: Into a pint of cold-drawn linseed oil, put a mixture of alkanet-root and rose pink in an earthen vessel; let it remain all night, then, stirring well, rub some of it all over the tables with a linen rag; when it has lain some time, rub it bright with linen cloths.

MARBLE, To Clean.—Take 2 ounces of common soda, and one of pumice stone, and one of finely powdered chalk; sift them through a fine sieve and mix them with water. Then rub the mixture well all over the marble, and the

stains will be removed; now wash the marble over with soap and water, and it will be as clean as it was previous to its being stained. Sometimes the marble is stained yellow with ironrust; this can be removed with lemon juice.

MARBLE, To Remove Grease Or Oil in.—French chalk reduced to powder, dusted over the spot, and a hot flat-iron held very near, to soften the grease and make the chalk absorb it. If this will not do, try common clay mixed with benzine smeared over the spot.

MARBLE, To Remove Smoke-stains from.—Take a large lump of Spanish whiting, soak it in water, not more than enough to moisten it, and put into the water a piece of washing soda; put some of this whiting on a flannel, and rub the marble repeatedly, leaving the whiting on for some hours. Wash it all off with soap and water, dry well, and polish with a soft duster.

MARKETING, Hints on.—The purchaser will do well to keep in view one or two simple rules. Whatever kind of provisions may be required, it is invariably the wisest course to deal with those tradespeople who have a large business, and who are known and respectable. It is the interest of such persons to supply their customers with the best articles, and for this purpose they themselves must go to the best markets. As a general rule they are under no temptation to overcharge their customers. Their success in business and their profit depend on the number of their retail transactions, and if the number be great, they are all the more able to supply the best articles, and to be content with the smallest profits on each individual sale. As an illustration of this it may be stated that, with very few exceptions, all commodities are dearer, as well as of inferior quality, in shops in the suburbs than in those situated in places of the greatest concourse: the reason is that small dealers, who have comparatively few transactions, must necessarily make up for the defects of their business by obtaining large profits on individual sales, while, at the same time, they have little or no encouragement to obtain the best goods, and in many cases want of sufficient capital renders this impracticable. It will be usually found, however, that there is no economy in purchasing inferior articles. In butcher's meat, for example, the best meat, and the best parts of the meat, although at first a little dearer, are in reality cheaper in the end.

MILDEW, To Remove.—Mix soft soap with powdered starch, half as much salt, and the juice of a lemon; lay the mixture on both sides of the stain with a painter's brush; let it lie on the grass day and night till the mildew mark disappears.

MOULD IN BOOKS AND INK, To Prevent.—A few drops of lavender will save a library from mould; a single drop will save a pint of ink. A little salt or white wine will also preserve ink from mould.

MUSLINS, To Make Uninflammable.—Tungstate of soda, prepared expressly for rendering fabrics noninflammable, is used for this purpose. Directions for use:—To 3 parts of dry starch add 1 part of tungstate of soda, and use the starch in the ordinary way. If the material does not require starching, mix in the proportions of 1 pound of tungstate of soda to 2 gallons of water, saturate the fabric well with this solution and dry it. The heat of the iron in no way affects the non-inflammability.

OIL CLOTH, How To Clean.—To ruin them—clean them with hot water or soap suds, and leave them half wiped, and they will look very bright while wet, and very dingy and dirty when dry, and soon crack and peel off. But if you wish to preserve them, and have them look new and nice, wash them with soft flannel and lukewarm water and wipe thoroughly dry. If you want them to look extra nice, after they are dry, drop a few spoonfuls of milk over them, and rub them with a small dry cloth.

OIL (KEROSENE), To Test.—The only reliable test is the temperature of the flashing point, that is, the temperature at which the petroleum takes fire when a burning match is applied to its surface. This test can be easily applied. Into a flat dish or saucer, pour the oil to be tried, until it is at least half an inch deep; then hold a burning match or paper near the surface. At the point of contact the combustion is often very lively, as the taper draws up some of the liquid, but if the petroleum be safe and free from naphtha, the flame does not spread over the surface. If the petroleum has been adulterated, as soon as the match touches the surface a blue lambent flame flashes across it, and in a few moments the body of the oil will be on fire. Such an oil is dangerous—liable to explode in lamps, and to give off inflammable vapors at all times. Any oil which takes fire when a match is held near its surface, and continues to burn, ought to be condemned at once and thrown into the streets.

OVEN AND IRON WARE (New) To Temper.—Before new ovens are used, they should be heated half a day, and then put up the lid to keep the heat in. When heated the second time, they may be used for baking. If not treated in this way, they will never retain heat well. New flat-irons should be heated half a day before they are used. Iron ware of all kinds, and stoves should be heated gradually at first or they may crack.

PAINT, To Clean.—Provide a plate with some of the best whiting to be had, and have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, apply it to the painted surface, when a little rubbing will instantly remove any dirt or grease. After which wash well with clean water, rubbing it dry with soft flannels. Paint thus cleaned looks as well as when first laid on, without any injury to the most delicate colors. It is far better than using soap, and does not require more than half the time and labor.

PAINT, To Remove Odor of.—Place a vessel full of lighted charcoal in the middle of the room and throw on it two or three handfuls of juniper berries. Shut closely the windows, doors and all means of ventilation for about twenty-four hours, when they may be opened and it will be found that the unpleasant smell will be entirely gone. This will not injure articles left in the room, such as tapestry, etc., and can be considered reliable.

PAPER-HANGINGS, To Clean.—Cut into 8 half-quarters a stale quartern loaf; with one of these pieces, after having blown off all the dust from the paper to be cleaned by means of a good pair of bellows, begin at the top of the room, holding the crust in the hand, and wiping lightly downward with the crumb, about half a

yard at each stroke, till the upper part of the hangings is completely cleaned all round; then go again round with the like sweeping stroke downward, always commencing each successive course a little higher than the upper stroke had extended, till the bottom be finished. This operation, if carefully performed, will frequently make very old paper look almost equal to new. Great caution must be used not by any means to rub the paper hard, nor to attempt cleaning it the cross or horizontal way. The dirty part of the bread too must be each time cut away, and the pieces renewed as often as is necessary.

PAPER-HANGINGS (Poisonous), Test for.—A good test for poisonous paper-hanging is common spirits of hartshorn, or ammonia is a sure one of arsenic. On application the beautiful but dangerous green turns to a blue. The existence of arsenic in rooms hung with green paper may also be immediately detected by lighting a bit of the suspected paper at a candle. When the paper is well lighted, blow it out, then smell the smoke, if it contains arsenic, the smell will be that of garlic.

PAPER, To Remove Stains from.—The process must depend on what the stains are. If they are those of writing ink, a solution of citric, tartaric, or oxalic acid will be successful. If grease, take a heated iron and press it upon blotting-paper placed on the stains. After this process has been frequently repeated, take a soft brush and apply oil of turpentine to the stains on both sides of the paper; lastly, with a clean brush, apply to the spots already almost gone rectified spirit of wine.

PAPER, To Take Writing Out of.—Solution of muriate of tin, two drachms; water, four drachms. To be applied with a camel's hair brush. After the writing has disappeared, the paper should be passed through water, and dried.

PAPER-MACHE, To Clean.—Wash the article well with cold water and a sponge, dust flour over it while still damp, and rub dry with flannel.

PEWTER, To Clean.—Apply to the surface of the vessels a fine sand mixed with oil of tartar; then polish.

PICTURE FRAMES, To Prevent Flies From Injuring.—Boil three or four onions in a pint of water: then with a gilding brush do over your glasses and frames, and the flies will not alight on the article so washed. This may be used without apprehension, as it will not do the least injury to the frames.

PICTURES, How To Hang.—The worst position in which a painting can be placed is directly opposite a window, as its surface so reflects the light that the object cannot be seen except from a side view. The picture ought to be hung so as to allow the light from the window to fall upon it from the same side in which the artist saw or imagined the picture to appear in nature; that is to say, the shadows in the picture ought to be on that side of the objects which is opposite to the direction from which the light comes: for example, in the case of a tree or house, if the window is on the right hand the shadows on the picture must be towards the left hand of the observer, as if projected from the right side to the left, as would be the case in nature if the light fell upon the right of the objects perceived.

PLATE, How To Clean.—In the first place every particle of grease must be removed by means of a thorough hot soap suds in which is dissolved a small bit of cooking soda, it must then be thoroughly rinsed in clear warm water, and wiped with a dry soft towel or a piece of wash leather. It may then be rubbed with fine whiting with a bit of flannel or chamois skin; if there are stains on the plate the whiting should be rubbed on mixed with water or a little sweet oil and allowed to remain several hours, but if the silver is merely tarnished it will be sufficient to give it a dry polish by using the whiting of very fine plate powder, dry, and polishing by a soft wash leather, cleansing the chased portions with a soft bristle brush.

All plate and silver in common use should be cleaned at least once a week, but too severe rubbing will soon wear out even the celebrated Sheffield plate.

Plate should be well protected in a dry closet or drawer; a box lined with flannel is the best article. The practice of leaving plate exposed on the side board is injurious to the plate, from the fact that there exists in the air a portion of sulphureted hydrogen gas, which turns the silver black.

Another habit of melting off spermaceti from candle-sticks by placing them near the fire is also destructive; if moderately hot water will not remove the grease, a little alcohol will.

POTS, (IRON) To Mend.—Mix finely sifted lime with some white of an egg, till a thin kind of paste is formed, then add some iron filings. Apply this to the fracture, and the vessel will be found nearly as sound as ever.

PUTTY, To Remove.—Putty that has become hardened may be rendered soft, so as to be easily removed, by the application of a hot iron to it. In this way it may be readily removed, where glass is broken, without injury to the sash.

UMBRELLAS, To Make Last Twice As Long As Usual.—Most persons, when they come in from the rain, put their umbrellas in the rack with the handle upward. They should put it downward; because when the handle is upward the water runs down inside to the place where the ribs are joined to the handle, and cannot get out, but stays rotting the cloth and rusting the metal until slowly dried away. The wire securing the ribs soon rusts and breaks. If placed the other end up, the water readily runs off, and the umbrella dries almost immediately.

VENTILATION, How easily to secure.—For ventilation, open your windows at top and bottom. The fresh air rushes in one way and the foul air makes its exit by the other.

RAZOR STRAP, To Renew.—Rub clean talow over the surface, then apply the fine snuffings of a candle, or rub the strap with soft pewter or lead.

RIBBONS OR SILK, To Keep.—In putting away ribbons or silk, wrap or fold them in coarse brown paper, which, as it contains a portion of tar or turpentine, will preserve the color of the article, and prevent white silk from turning yellow. The chloride of lime used in manufacturing white paper renders it improper to keep silks in, as it frequently causes them to spot or to change color.

RUG, To Make a.—A very economical rug can be made in the following manner: take coffee-sacks and sew together of the required size,

which fasten upon a rough frame of lath nailed together. Trace a design in the center—for instance a diamond, and a waved or pointed border. Geometrical designs are usually prettier than those miserable, stiff masses called flowers. To work this sacking as if it were canvas, prepare balls of assorted rags sewed together, as for carpets, except that they must be cut evenly and not more than half an inch wide; wind each color in a separate ball. Now take a large hook—you can manufacture one from a piece of wire. Put the strip to be worked underneath, and insert the hook from the upper side, catch the strip below, and draw it up through the foundation about one half an inch, making a loop; put the hook through the next diagonal place, and draw up another loop; proceed in this way, following the outline of the center design. Three times around is enough of the outline color; then work the outline of the border, and fill up the margin. Fill up the inside figure with a contrasting color. Next work the corners; and fill up the ground with a dark color. Remove from frame and hem the edges underneath the work. This rug is durable, and can be made quite handsome, with good colors.

RUGS, (SHEEPSKIN) To Clean.—Make a very strong lather, by boiling soap in a little water, mix this with a sufficient quantity of water (rather more than luke-warm), to wash the mat or rug in, and rub boiled soap on those portions of it which require additional cleansing. When the mat has been well washed in this water, prepare another lather in the same way, in which a second washing must take place, followed by a third, which ought to be sufficient to cleanse it thoroughly. Rinse it well in cold water until all the soap is removed, and then put it in water in which a little blue has been mixed, sufficient to keep the wool of a good white, and prevent its inclining to yellow. After this it should be thoroughly wrung, shaken, and hung out in the open air with the skin part towards the sun, but not while it is scorching, otherwise the skin will become hard. It must also be shaken often while drying, for if not it will be quite stiff and crackly. It should be frequently turned, being hung up first by one end and then by the other, until it has dried entirely.

SILVER, To Give Luster To.—Dissolve a quantity of alum in water, so as to make a pretty strong brine, and skim it carefully; then add some soap to it, and dip a linen rag in it, and rub over the silver.

SILVER ORNAMENTS, To Clean.—Boil them in soap and water for five minutes; then put them in a basin with the same hot soap and water, and scrub them gently with a very soft brush while hot; then rinse and dry with a linen rag. Heat a piece of common unglazed earthen ware, or a piece of brick or tile in the fire; take it off, and place the ornaments upon it for the purpose of drying them, and causing every particle of moisture to evaporate; as the moisture, which otherwise would remain on the silver, will cause it to tarnish, or assume a greenish hue. All ornaments, whether gold or silver, can be kept from tarnishing if they are carefully covered from the air in boxwood sawdust, which will also dry them after being washed.

SILVER PLATE, To Take Stains Out Of.—Steep the plate in soap lyes for the space of four hours; then cover it over with whiting, wet

with vinegar, so that it may stick thick upon it, and dry it by a fire; after which rub off the whitening, and pass it over with dry bran, and the spots will not only disappear, but the plate will look exceedingly bright.

SPOTS, GREASE, To Remove.—1. Take benzine, 20 ounces; alcohol (strong), 5 ounces; ether, 2 drachms; ammonia, 1 drachm.—2. (*Fazelle water.*) Take bleaching powder, 1 ounce; carbonate of potassa, 1 ounce; water, 33 ounces. Triturate the bleaching powder in the cold with 25 ounces of water, then add the carbonate of potassa, previously dissolved in the rest of the water, shake well and let it settle. The supernatant liquor is filtered, if necessary, and mixed with one ounce of hydrochloric acid, when it is ready for use.

SPOTS, (GREASE) To take out of Silk.—Take a lump of magnesia, and rub it wet over the spot; let it dry, then brush the powder off, and the spot will disappear; or, take a visiting card, separate it, and rub the spot with the soft internal part, and it will disappear without taking the gloss off the silk.

STAINS OF NITRATE OF SILVER, To Remove.—Grimm states in a German journal that chloride of copper completely removes nitrate of silver stains from colored cotton cloth. It should afterward be washed with hyposulphite of soda, and then thoroughly washed with water. Such stains are more effectually removed from white cotton or linen cloth, by applying to it a dilute solution of permanganate of potash and hydrochloric acid, which is to be followed by washing with hyposulphite of soda and plain water. This process renders the use of the highly poisonous cyanide of potassium unnecessary.

STEEL ARTICLES, To Preserve from Rust, when not in Use.—Sleigh runners, skates, &c., which are only used for a limited time during the year, may be effectually preserved from rust by a coating of common lard and pulverized black lead, containing a little camphor.

STEEL, To Remove RUST from.—This can be done by a free application of kerosene oil, allowing the oil to remain on until the rust is loosened, and can be rubbed off.

STOPPER (Glass) To Remove.—Apply hot water to the neck of the bottle, which will expand, while the stopper retains its former temperature and becomes loose.

STOVES BLACKING.—Blackening for stoves may be made with $\frac{1}{2}$ a pound of black lead finely powdered, and (to make it stick) mix with it the whites of 3 eggs well beaten; then dilute it with sour beer or porter till it becomes as thin as shoe-blackening; after stirring it, set it over hot coals to simmer for 20 minutes; when cold it may be kept for use.

TABLES, To remove Marks from.—If a whitish mark is left on a table, by carelessly setting on a pitcher of boiling water, or a hot dish, pour some lamp oil on the spot, and rub it hard with a soft cloth. Then pour on a little spirits of wine or cologne water, and rub it dry with another cloth. The white mark will thus disappear, and the table look as well as ever.

TAR, PITCH OR TURPENTINE, To Remove.—Scrape off as much as you can; then wet the place thoroughly with good salad oil, and let it remain for twenty-four hours. If linen or cotton wash it out in strong warm soap-suds; if

woollen or silk, take out the oil with ether or spirits of wine.

If the stain is of tar, you may remove it (after scraping and wiping), by using cold tallow instead of sweet oil. Rub and press well on the spot a small lump of good tallow, and leave it sticking there till next day. Then proceed as above.

TEA-KETTLE, To Clean.—Put into the tea-kettle a flat oyster-shell, and keep it constantly there. It will attract the stony particles that are in the water to itself, and prevent their forming upon the tea-kettle.

TIN, How To Clean.—Never use lye to clean tin, it will soon spoil it. Make it clean with suds, and rub it with whiting, and it will look well, and last much longer.

TIN-PANS, How To Mend.—This can be done quickly and easily by the use of putty, and is much better than to throw them away. Put it on the outside; let it dry thoroughly, and they will never need mending in the same place again.

WALLS (DAMP), Remedy for.—An excellent remedy for damp walls is washing them with a strong solution of alum.

WALL-PAPER, To Extract Grease Stains from.—Oil marks can be taken from the paper on drawing-room walls, and marks where people have rested their heads, by mixing pipeclay with water to the consistency of cream, laying it on the spot, and letting it remain till the following day, when it may be easily removed with a pen-knife or brush.

WATER, How To Test.—Mechanical impurities in water are removed only by filtration; chemical impurities cannot be removed in this manner. If lime is supposed to be present in water, the best test is to mix with it a small quantity of oxalic acid in a small vessel; lime, if present, will be revealed in a white precipitate. Carbonate of iron is best detected by the tincture of galls, which produces a black precipitate. If the penknife, dipped in water, assumes a yellowish coating, copper is present. The best method of detecting the presence of vegetable and animal matter is by dropping into it a small quantity of sulphuric acid; the water becomes black.

WATER, Purification of.—Mr. Booth, of Birmingham, England, has lately made known a very simple process for disengaging from water all organic matters. By this method it is sufficient to prepare a neutral solution of bi-sulphate of alumina, and add the water to be purified in the proportion of one ounce to 435 gallons. As soon as this is done, a cloud is formed in the liquor, and flocks rapidly descend, taking to the bottom all organic matters, and debarrassing the water of all coloring matter, and disagreeable taste and smell. In six or eight hours the deposit is complete. The principle of this operation is the following: All water contains bi-carbonate of lime, in a more or less proportion. The sulphuric acid of the bi-sulphate of alumina combines with the lime to form a sulphate of lime nearly insoluble, which is precipitated. The hydrate of alumina becomes free, and forms with the organic matters an insoluble product. The carbonic acid of the bi-carbonate is set free and communicates to the water an agreeable taste. For very hard waters, it is sufficient to add to them a very weak dose of bi-carbonate of soda, to entirely free them of their excess of lime.

WATER (Muddy) To Clean.—Water other-

wise pure, but contaminated simply with clay (as may be the case with the water of rivers after heavy rain or fall of snow), becomes at once clarified by very minute quantities of some salts of lime; one thousandth part of chloride of calcium for one part of water effects this purpose in a moment; the nitrate, bi-carbonate, and caustic lime act in the same manner. The precipitated substance may be readily separated from the water by filtration, whereas the filtration of the water containing the suspended matter is very difficult, because the pores of the filters become choked. The practical importance of this matter is very great, since it is, for instance, a well-known fact that the water of some rivers does not, in winter time, and after heavy rain-fall or snow-storms, become quite clear, even if left at rest in large ponds for a considerable time.

WATER FILTER, Home-made.—Rain water is much healthier than hard water as a beverage; and the following will be found an easy and cheap way to fit it for drinking purposes:

Have an oak tub made, holding from half, to a barrel, according to the amount of water needed in the family; let it stand on end, with a faucet at the bottom; or, I prefer a hole through the bottom, near the front side, with a tube in which prevents the water from rotting the outside of the tub; then put clean pebbles 3 or 4 inches in thickness over the bottom of the tub; now have charcoal pulverized to the size of small peas (that made from hard maple is best) and put in half a bushel or so at a time; pound it down quite firmly; then put in more and pound again until the tub is filled to within 8 inches of the top; and again put on 2 inches more of pebbles; then put a piece of clean white flannel over the whole top as a strainer.

The flannel can be washed occasionally, to remove the impurities collected from the water, and it might be well to put a flannel between the pebbles and charcoal at the bottom also. When the charcoal becomes foul, it can be renewed as before, but will work a year without renewing.

WINDOWS, To Clean.—Remove stains and dust with soap and water, then apply with a moistened rag powdered indigo, rotten-stone, or fuller's earth. Dry with a soft cotton cloth.

WINDOW GLASS, To Prevent the Sun from Passing Through.—Pound gum tragacanth to a powder, and put it, for twenty-four hours, to dissolve in white of eggs, well-beaten. Lay a coat of this on your glass with a soft brush, and let it dry.

WINDOW SASHES, To Prevent Rattling.—The sashes in very many costly and elegant dwellings are frequently so loose from some cause, that when winds blow even gently they will rattle and bang from stop to stop, like the

shrunk and decayed portions of some forsaken and dilapidated castle. The remedy is by no means difficult or expensive. Let the sashes be taken out of the window frame, and every part of the window examined. If the jamb-casings have been sprung, or are warped and twisted, the first step will be to remove the stops and straighten the face of the casings, which may be done most conveniently with a large rabbit-plane and a smoothing-plane. In case the sashes should be much too narrow for the frame, let one edge be dressed off true, and a thin strip fitted neatly, and glued and nailed to the edge of one stile. See that the outside edge of such stile is not tapering, even by the thickness of a heavy shaving. When the stile are tapering only a trifle, the sashes cannot be moved up and down easily. Now put the upper sash in its place, and fasten the central stop with two or three long, slender wood screws, after which remove the outside stops and place them so closely to the stiles of the sash that the window will not rattle. Then let the stops be secured on the inside so closely to the stiles of the sash that will move up and down easily, without having so much play that the wind will rattle it. When the sashes have been fitted as directed, there will be no more need of "weather strips" of any kind to exclude dust and cold air, and the expense of refitting a window as directed will be much less than the cost of weather strips.

WINDOW SASHES, To Keep in Place.—These may be kept up without sash-lines and pulleys, by means of cork, in the simplest manner, and with scarcely any expense. Bore three or four holes in the sides of the sash, into which insert common bottle corks, projecting about the sixteenth part of an inch. These will press against the window-frames, along the usual groove, and by their elasticity support the sash at any height which may be required.

WEIGHTS AND MEASURES Household.—Wheat flour weighs one pound to a quart. Indian meal, one pound two ounces to a quart. Butter, when soft, one pound to a quart. Loaf sugar, broken, one pound to a quart. White sugar, powdered, one pound one ounce to a quart. Eggs, average size, ten to a pound.

WOOD (New) To Remove Taste from.—A new keg, churn, bucket, or other wooden vessel will generally communicate a disagreeable odor to anything that is put into it. To prevent this inconvenience first scald the vessel with boiling water, letting the water remain in it till cold. Then dissolve some pearlsh or soda in lukewarm water, adding a little bit of lime to it, and wash the inside of the vessel well with the solution. Afterward scald it well with plain hot water, and rinse it with cold water before you use it.

HOUSEHOLD PETS.

AVIARY, The.—Strictly speaking, an aviary is a considerable space fitted up and adapted to accommodate a large number and variety of birds remarkable for their singing qualities, the beauty

of their plumage, or other peculiarities. An aviary, as a matter of course, is a large cage in which an attempt is made to give a natural appearance to the interior of the place where the

feathered prisoners are confined. Perches resembling the branches of trees, grass, moss, various plants, patches of gravel or sand, a rill of clear water, secluded places for nests—in a word, everything is provided that the birds can require short of liberty; which, indeed, in a climate like ours, and in the absence of those natural supplies so easily obtained in their native places, would be a more than doubtful blessing to many of them, inasmuch as no foreign species would long survive emancipation.

In a large aviary possessed of all such appliances as we have adverted to, favorably situated and carefully attended, most of the little captives will thrive and be cheerful, and many of them will build and bring up their young. Such establishments, however, are rare; and it may be doubted whether the expense, trouble, and anxiety inseparable from the keeping of them, are not too great for any satisfaction which they produce. This, however, is a matter of opinion.

AQUARIUM (The) Principles of.—The aquarium may consist either of salt water, with marine animals and plants, or fresh water with fresh water animals and vegetable life. But whether the one or the other be chosen, the principle on which its freshness and actual existence depend is the same—namely, the proper balance between the oxygen given off by the plants and the carbon thrown off by the fish or other animals; the combination of the two gases preserving the water pure, keeping the animals alive, and sustaining the growth and renewal of the plants. The scientific principle by which we imitate nature in the aquarium is very well explained by Sir David Brewster: "Water has the power of absorbing certain quantities of atmospheric air and various gases; the presence of air gives to rain and spring water their refreshing qualities, as may be proved by expelling the air from water by boiling and then tasting the insipid liquor that remains. Ordinary water always contains a certain amount of atmospheric air and also a trace of carbonic acid, which gas is a compound of oxygen and carbon in the proportion of sixteen to six. The leaves of plants when acted upon by light, decompose this gas, and, having no necessity for oxygen, they merely absorb the carbon. Animals, on the other hand, require oxygen for the purpose of removing the waste carbon of great divisions of organized beings. But two other elements play an important part in the phenomenon of life—namely, nitrogen and hydrogen. Both plants and animals require these gases as food. They combine to form ammonia, which is found in small portions in the atmosphere and in water. Ammonia is indeed the main fertilizing element in vegetable life. Plants obtain their supply of it either through the natural water absorbed at their rootlets, or by means of artificial manures; animals, through the means of the substances they devour. All forms of vegetable and animal life are built up of these four elements."

AQUARIUM, How to Make and Fill.—First, as to the tank or globe—the receptacle for your water and its living plants and animals. Whether you determine on a marine or a fresh water aquarium, the tank is the same. It may be either square or round. If square or rectangular, it should be perfectly water tight, with a plain piece of glass to place loosely over the top at night and when the room is being dusted. A propagating glass turned upside down forms a

good, strong round tank, which may be purchased cheaply of the dealers in horticultural glass; lately, indeed, they have been made of graceful shape in perfectly white glass, purposely for use as aquaria. The advantage of square over round tanks, is that they do not enlarge or distort the objects seen within them.

Having bought your tank, your next task is to fill and stock it. It must be prepared for the plants and animals by placing at the bottom a layer of stones and gravel: fresh water gravel for fresh water, stones and sand for salt water. These form a basis or foundation for the roots of the plants. It is well also to have a little rock work rising from the bottom, just above the surface of the water. Then fill it with water. For a fresh water aquarium, ordinary water will do, but for a marine aquarium you must have the proper sea water. Do not try the artificial sea water advertised, but get a sufficient quantity from the sea itself, taken at some distance from the shore. This you can procure without much trouble or expense. But if real sea water is very difficult to procure, the following mixture will form a tolerably good substitute. It so nearly assimilates to the actual composition of salt water that it will support life in the marine aquarium: Common salt (chloride of sodium) $3\frac{1}{2}$ ounces; Epsom salts (sulphate of magnesia), $\frac{1}{4}$ ounce; chloride of magnesium, 200 grains troy; chloride of potassium, 40 grains troy. These materials, properly dissolved, are to be added to four quarts of common soft water, the same proportions being observed if you enlarge the quantity.

AQUARIUM, Home Made.—Cut a narrow groove in a board the size you wish, set four pieces of glass on edge in the grooves; put a piece of zinc in the bottom; on the board make a light frame, the size of the top, with grooves; pass a small rod through the frame down the inside of the corners, through the bottom, and screw up tight; put cement in all the corners, and you will have an aquarium at very trifling cost. To make the cement, take one part, by measure, of litharge; one part plaster of Paris; one part fine beach sand; one-third part fine powdered rosin; mix all together. This may be kept for years, while dry, in a well-corked bottle; when used, make in a putty with boiled linseed oil; a little patent dryer may be used; it will stand water at once, either salt or fresh.

AQUARIUM (FRESH WATER), To Make.—Presuming that you begin with a fresh water aquarium, you will find the best weed to grow in the water is the *anacharis alsinastrium*, the weeds which often choke the canals and inland streams. This pretty moss-like plant may be easily procured from almost any canal at any time of the year. Another weed which does admirably in the aquarium is the *ranunculus aquatilis* (the water crowfoot), which may be taken from any pool during the spring months, and placed in the tank, when it will send down roots and grow abundantly. Be careful to remove all broken or decaying shoots, and keep the weeds from multiplying too fast, or the balance between animal and vegetable life will be destroyed.

In stocking a fresh water aquarium great choice is left for the young naturalist. He may have small carp, gold fish, minnow, or almost any kind of river fish, with water newts, or efts, or even a good sized frog, which is by no means an ugly or uninteresting animal. The frogs and

newts will crawl occasionally to the top of the rock and sun themselves. A diving spider is also a good addition; but you must by no means neglect a good supply of water snails and fresh water shrimps, which will be found very useful in eating away the conferva, or green slime-weed that collects on the glass. Sticklebacks are very amusing little fish, but they must be kept by themselves, for they are quarrelsome fellows, and have an ugly knack of poking their sharp spikes into and mortally wounding the other inhabitants of the tank. Some water beetles are also harmless, but others prove a great nuisance. You must avoid placing young pike in your tank, though by themselves they are amusing.

AQUARIUM, (MARINE) To Make.—For the marine, or sea water aquarium, the sea anemone (actinia) and various kinds of crabs may be had in great variety of the dealers; and if you are fond of sea side wandering you may procure them for yourselves among the rocks and in the little pools on the shore when the tide is out. Sea snails, shrimps, star-fish, &c., may be introduced at pleasure; while for the plants, any of the small sea weeds will do. When gathered, a little piece of the rock to which they grow should be chipped off, and the plants placed in the tank without being detached or bruised. The plants and rock-work should be arranged picturesquely. Remove any sick or dying animals, so as to prevent the water from becoming foul.

AQUARIUM, How to Manage when Complete.—The aquarium should be placed on a stand or table in a good light; and if the sun shine directly on either side, that part should be protected by a green baize curtain which may be removed when the sunshine departs. Once fixed, the tank should not be disturbed. A window with north-western or western aspect is a capital situation. Be careful not to crowd your tank, and when you find the water level getting too low, raise it by addition of more water; but do not meddle with the arrangement of the tank too often or you will alarm your live stock. In the management of the aquarium, as in other pet fancies, cleanliness is the grand secret of success.

BIRDS, (TAME) Disorders Of.—All tame animals are much more subject to disease than wild ones: and birds so much the more, as they are often shut up in very small cages, where they can take no exercise. It is often supposed that birds, in their natural free state, have no diseases; but people who will take the trouble to observe, will soon perceive the falsehood of this assertion. We have often found hedg sparrows full of pimples, particularly in the naked parts, the feet, and round the beak. Their diseases are often increased by the delicacies of all kinds which are given them, such as biscuits and sugar, which injure the stomach, and cause a slow decay.

BIRDS, The PIP in.—This is a catarrh, or cold, by which the nostrils are stopped up, and the membrane covering the tongue is hardened by inflammation. In large birds it is common to remove this skin, taking it off from the base to the tip; by this means this part can again perspire, the saliva necessary for digestion can flow, and the taste and appetite returns. A mixture of fresh butter, pepper, and garlic, generally cures this catarrh. It is a good thing, also, for the birds to drink the pectoral infusion of speedwell; and the nostrils may be opened by passing up a small feather. The ruffling of the head, the

beak often open and yellow at its base, and the tongue dry, are the most decisive indications of this disease.

BIRDS, The Rheum in.—The symptoms of this disease are frequent sneezing and shaking of the head. Some drops of pectoral elixir in the infusion of speedwell, which the sick birds must be made to take, appears to me to be the most efficacious remedy. Give fowls about 20 drops of the elixir in a glass of the infusion.

When it is merely hoarseness, Dr. Handel, of Mayence, gave to his birds for several days, as their only drink, a very diluted decoction of dry figs, sweetened with a little sugar, and afterward purged them for two days following, with the juice of carrots.

BIRDS, Asthma in.—This is a very common disease among house birds. Those attacked with it have their breath short, often open their beaks as if to gasp for more air, and, when agitated or frightened, keep them open for a long time.

The cause of this disease may doubtless be found in the mode of life which these birds lead. Their food is generally too dry and heated, being principally hemp seed, which is very injurious, but liked by all; and is the more hurtful, as it inclines them to eat too much. If to this be added the unchanged air of the rooms, particularly those which have stoves instead of chimneys, and the great heat which is kept up during winter, it is plain that there is much to injure the delicate lungs of these birds.

A moist and refreshing regimen and some aperients, more or less often, according to the violence of the disease, appears the most appropriate remedy. A favorite linnet and goldfinch, when attacked with very bad asthma, were relieved and preserved for several years by the following method.

The first thing was to leave off hempseed entirely, confining them solely to rapeseed; but giving them at the same time abundance of bread, soaked in pure water, and then pressed; lettuce, endive, or watercresses, according to the seasons, twice a week, giving them boiled bread and milk, about the size of a nutmeg. This is made by throwing a piece of the crumb of white bread, about the size of a nut, into a teacupful of milk, boiling it, and stirring it all the time with a wooden spoon till it is of the consistency of pap. It must be quite cold before it is given to the birds, and must always be made fresh, for if sour it will prove injurious.

This paste, which they are very fond of, purges them sufficiently, and sensibly relieves them. In very violent attacks, nothing but this paste ought to be given for two or three days following, and this will soon give the desired relief.

When the disease is slight, or only begun it is sufficient to give the bread and milk once in three or four days. When employed under similar circumstances, this treatment has cured several very valuable birds. It may not be useless here to renew the advice of always giving the birds an opportunity of bathing every day, by putting in their way a saucer, or any other small shallow bath, filled with water, which should never be too cold, and in winter always milk warm.

One thing which is very injurious to the lungs of birds, and which too often occurs, is the fright occasioned by tormenting them, or by seizing them too suddenly; for the poor little things often rupture a blood-vessel in the breast while

beating themselves about; a drop of blood in the beak is the sign, and a speedy death is the general consequence. If this does not happen, the breathing is not the less difficult and painful; and recovery is rare, at least without the greatest care and attention.

Birds which eat insects and worms, occasionally, by accident, swallow some extraneous substances, which, sticking in their throat, stops their respiration, and stifles them. The only remedy is to extract the foreign body, which requires much skill and dexterity.

When asthma is brought on by eating seeds which are too old, spoiled, or rancid, Dr. Handel recommends some drops of oxymel to be swallowed for eight days following. But the best way is to change the seed, and be sure there is none but good seed in the trough.

BIRDS, Atrophy or Wasting in.—This is caused by giving unnatural food to the bird, which destroys the digestive power of its stomach. In this case it disgorges, ruffles its feathers, and does not arrange them, and becomes thin very fast. The best thing is to make it swallow a common spider, which purges it, and put a rusty nail into its water, which strengthens the intestines, giving it at the same time its proper and natural food. Green food, such as lettuce, endive, chickweed, and particularly watercresses, is the safest remedy. A very great appetite is a sign of this disease. A siskin, that was dying of atrophy, had nothing but watercresses for three days following, and on the fourth he sung.

BIRDS, Consumption or Decline in.—This disorder may be known by the extreme thinness of the breast, the swelling of the lower part of the belly, the total loss of appetite, and similar symptoms. As a cure, Dr. Handel recommends the juice of the wild turnip to be given to drink instead of water.

BIRDS, Costiveness in.—This disease may be discovered from the frequent unsuccessful endeavors of the bird to relieve itself. Aperients will be of use. If a spider does not produce the desired effect, anoint the vent of the bird with the head of a pin steeped in linseed oil; this sort of clyster generally succeeds; but if the disease attacks a bird which eats meal worms, one of these, bruised in sweet oil and saffron, is the most certain remedy, and the bird will swallow it without the least hesitation. Boiled bread and milk is generally of great use.

BIRDS, Diarrhoea in.—This is a disease to which birds that have been caught recently are very subject, before they are accustomed to their new food. Most of these die of it; they continually void a white calcareous matter, which sticks to the feathers round the vent, and being very acrid causes inflammation in that part and in the intestines. Sometimes chalybeate water and the oil clyster produce good effect; but it is better, if possible, to procure for the bird its most natural food. Some people pull out the feathers from the tail and vent, and then rub these parts with fresh butter, but this is a very painful and cruel operation. They also mix the yolk of an egg boiled very hard with their food, but we have never found this succeed very well. If there be any hope of curing this disease it is by attacking it at the beginning, before inflammation is violent; boiled bread and milk, a great deal of lettuce, or any other similar green refreshing food, in general completely cures them.

In a case of chronic diarrhoea, which almost reduces the birds to skeletons, Dr. Handel prescribes chalybeate water mixed with a little milk for their drink, which, he says, is an easy and certain cure.

BIRDS, Bloody Flux in.—This is a disease with which some parrots are attacked. The best remedy is to make the birds drink a great deal of boiled milk, or even very fat broth; for their intestines, which are very much irritated, require something soothing to protect them from the acrid discharges, which, at the same time, must be corrected by healing food. Birds in this state generally do nothing but drink, therefore plenty of boiled milk should be given them, as it nourishes them as well as acts medicinally, but should it appear to turn sour in the stomach it must, at least for some time, be discontinued.

BIRDS, Obstruction in the Rump Gland.—This gland, which is on the rump, and contains the oil necessary for anointing the feathers, sometimes becomes hard and inflamed, and an abscess forms there. In this case the bird often pierces it itself, or it may be softened by applying fresh butter without any salt; but it is better to use an ointment made of white lead, litharge, wax, and olive oil, which may be had at any good chemist's. The general method is to pierce or cut the hardened gland, in order to let out the matter, but if this operation removes the obstruction it also destroys the gland, and the bird will die in the next molting, for want of oil to soften the feathers.

The gland is known to be obstructed when the feathers which surround it are ruffled, the bird never ceasing to peck them, and instead of being yellow it becomes brown. This disease is very rare among wild birds, for being exposed to damp, and bathing often, they make more use of the liquor in the gland, consequently it does not accumulate sufficiently to become corrupted, sour, or cancerous. This confirms the necessity of giving them the means of bathing as often as instinct would induce them, as nothing can be more favorable to their health.

BIRDS, (Cage) Moulting of.—Moulting, or changing their feathers, is a natural operation with birds, which cannot be prevented, but which must be assisted with care and attention. Cold is the greatest danger to which they are exposed; in passing through this state therefore, all draughts of air should be carefully guarded against. When the cages are open ones, or have much wire-work they ought to be partly covered up with a cloth or paper, to keep the birds warm and the cleaning of the cage need not take place more than once a week, though they must be carefully supplied with fresh food and water daily. A little saffron in their water, a little nourishing food, and the extra warmth occasioned by the covering to the cage, will soon restore the birds to a plumage more beautiful than that they cast off. The covering of the cage should not be cast off all at once, but gradually; it should then be cleaned thoroughly, and the birds have their ordinary food. They should, while moulting, be put in the sun for an hour or two, if the weather is fine and warm.

BIRDS (Singing) Food for.—Knead together 3 pounds of split peas, ground or beaten, $1\frac{1}{2}$ pounds of fine crumbs of bread, the same quantity of coarse sugar, the raw yolks of 6 eggs, and 6 ounces of fresh butter. Put about $\frac{1}{3}$ of the

mixture at a time in a frying pan over a gentle fire, stir it until a little browned, but not burned. When the other 3 parts are done, and all cold, add to the whole, 6 ounces of maw seed and 6 pounds of bruised hemp seed, separated from the husks. Mix together, and it will be found excellent food for thrushes, robins, larks, linnets, canaries, finches and most other singing birds, preserving them admirably in song and feather.

BIRDS, Paste for.—Take a white loaf which is well baked and stale, put it into fresh water till it is quite soaked through; then squeeze out the water and pour boiled milk over the loaf, adding about two-thirds the quantity of barley meal, from which the bran has been carefully sifted, or, what is still better, wheatmeal. Another method, however, may be adopted. Grate a carrot very nicely, soak a small white loaf in fresh water, press the water out of it, put it along with the carrot into an earthen pan, add handfuls of barley or wheat meal, and mix the whole together with a pestle. These pastes ought to be made fresh every morning, for they quickly become sour, and are consequently injurious to the birds.

BIRDS, Almond Paste for.—Pea meal 2 lbs., blanched sweet almonds 1 lb.; fresh butter or lard $\frac{1}{4}$ lb.; moist sugar 5 oz.; a shred or two of hay saffron; beat to a smooth paste, and granulate it by passing it through a colander. The addition of the yolks of 2 or 3 eggs improves it. Used to feed larks, nightingales, and other insectivorous birds. It will keep good for 6 months in a dry place.

BIRDS, German Paste for.—Take 4 fresh eggs, boiled very hard, $\frac{1}{4}$ lb. white peasemeal, and about a table spoonful of good salad oil—if the least rancid it will not do. The eggs must be grated very fine, and mixed with the meal and olive oil, and the whole then be pressed through a tin colander, to form it into grains like small shot, it should next be put into a frying pan, set over a gentle fire, and gradually stirred with a broad knife, till it be partially wasted and dried, the test of which will be its yellowish brown color. All insect eating birds may be kept upon this food throughout the year, except when they appear drooping and unwell, or at moulting time, when a few meal worms may be given to them twice or thrice a day.

BULLFINCHES.—Old birds should be fed with German Paste, and occasionally rape-seed. The Germans occasionally give them a little poppy-seed, and a grain or two of rice, steeped in Canary wine, when teaching them to pipe, as a reward for the progress they make. Bird organs, or flageolets are used to teach them.

BLACKBIRD, The.—The blackbird should be kept in a large cage, for it is not prudent to allow it to associate with other birds, as it will attack the smaller kinds. It is fond of frequent bathing and should be furnished with the means. The natural food of the blackbird is berries, worms, insects, shelled snails, cherries, and other similar fruit; and its artificial food, lean fresh meat, cut very small, and mixed with bread, or German paste.

CATS, Care of.—The cat is subject to several diseases; but, as a general rule, is seldom seriously ill. The best way to keep the animal in good health is to have it fed with regularity, kept clean, and furnished with plenty of pure water. In respect to the ailments of puss, "prevention is easier than cure," as it is in many matters of

higher moment. The cat ought not to be overfed. If she appears out of sorts, a little brimstone in milk will frequently be found useful.

CANARIES, Hints in Choosing.—In buying canaries, the birds which seem moderately shy are generally the best; an inexperienced person is too apt to be attracted by a very quiet manner; the birds seem so tame that they are bought quite eagerly, but unhappily they are apt to die soon after; the too great quietness being caused by illness. A real good bird will make no end of fuss, pretending to be a vast deal shyer than it really is, hopping from perch to perch, twisting its head about, and having, in fact an infinity of pretty airs and groans.

Bird dealers, again, always recommend the birds which sing loudly, and this to many persons is not at all desirable. The lower the tone the prettier and sweeter many would think the song. Birds with long, straight and tapering bodies are the best singers.

CANARIES, To Distinguish Sex of.—The male has generally deeper and brighter colors, a head rather larger and longish, and longer body, and a more elegant form. There is a feather under the beak, of the shape of a bean, placed lower than the rest, and the temples and circle around the eyes are of a deeper yellow than the other parts of the body. The throat of the male vibrates while singing, this never happens with the hen. If the bird be observed when it is singing, and if it be a cock you will perceive the throat heaving with this vibratory pulse-like motion, a peculiarity which is scarcely perceptible in the hen.

CANARIES, Care of.—1. Especial care must be taken to keep the canary thoroughly clean. For this purpose the cage should be strewed every morning with clean sand, or rather, fine gravel, for small pebbles are absolutely essential to life and health in cage birds; fresh water must be given every day, both for drinking and bathing; the latter being in a shallow vessel; and, during the moulting season, a small bit of iron should be put into the water for drinking. The food of a canary should consist principally of summer rape seed, that is, of those small brown rape-seeds which are obtained from plants sown in the spring, and which ripen during the summer; large and black rape-seeds, on the contrary, are produced by such plants as are sown in autumn, and reaped in spring. A little chickweed in spring, lettuce-leaves in summer, and endive in autumn, with slices of sweet apple in winter, may be safely given, but bread and sugar ought to be generally avoided. Occasionally also, a few poppy or canary-seeds, and a small quantity of bruised hemp-seed may be added, but the last very sparingly. Cleanliness, simple food, and fresh but not cold air are essential to the well-being of a canary. During the winter, the cage should never be hung in a room without a fire, but even then, when the air is mild, and the sun shines bright, the little prisoner will be refreshed by having the window open. The cage should never be less than eight inches in diameter, and a foot high, with perches at different heights.

CANARIES, Care of.—2. Place the cage so that no draft of air can strike the bird; give nothing to healthy birds but canary and rapeseed mixed, water, cuttle fish bone, and gravel on the floor of the cage; also occasionally, a little water for bathing; the room should not be overheated;

when moulting (shedding feathers) avoid drafts of air; give plenty of rape-seed slightly moistened, a little hard-boiled egg, and cracker grated fine is excellent; by observing these simple directions, birds may be kept in fine condition for years. Bad seed kills most of the birds that die; to which it might have been added, that canary birds are not only fond of, but benefited by having often a leaf of cabbage, piece of apple or other green food, which serves to keep down the tendency to fever and prevents constipation. Birds usually bathe each day as regularly as any one washes the face, and with apparent benefit too. When birds are sick and inclined not to eat well, remove all the food for a day, and then only give soaked bread, from which most of the moisture has been squeezed.

CANARIES (YOUNG) How to Tame.—The best way to tame a young bird is to keep it constantly beside you when working or writing; accustom the bird to having the hand put close to it, taking care never to startle it. Endeavor to get it to take hemp seed (of which they are very fond) from the fingers. When the cage is standing near the person who desires to tame the canary, it is a good plan, when the bird is quiet and no longer afraid, to open the cage door and lay a few cracked hemp seeds near it on the table; the bird will come out and hop about, but care must be taken that all is secure in the room, no open windows, no cat or dog present. It is also a good plan at night, when the bird is asleep, to put the hand into the cage, awaking it by bringing a light close to it, and then withdraw the hand with a gentle exclamation of fright when the bird pecks at it. He will thus consider himself the conqueror, and will cease to fear the invader. When this has been repeated two or three nights, the bird will be ready to fight the hand by daylight when out of the cage, and will take a hemp-seed from the fingers. He will also learn to shake hands, if the claw be suddenly touched at night very gently, and the words "shake hands" repeated in soothing tones. The greatest gentleness is required, and a cracked hemp seed should be invariably given by the hand only of the person who is training the bird; it should not be mixed with the ordinary food, but used merely as a reward, and he will soon learn to take it from between the lips of his trainer.

A bird may be easily taught to simulate death by placing it on its back in the hand, where it will remain perfectly quiet until summoned to rise at its instructor's voice, when its reward must be ready for it. It is also recommended by bird keepers to remove all food from the canary's cage after it has gone to roost, and to offer it to the bird in the morning in the hand. It will soon lose its fear, and will fly to meet its owner.

It must be remembered that in these pretty creatures there is a great difference of temper and disposition, and the aptitude for learning is not equally great in all; indeed, in some cases it is extremely difficult, and much patience is required to make them accomplished. With young birds there is always a much greater chance of success, particularly if they have been reared by the person who tries to tame them.

CANARIES, Insects on.—Parasites are among the most deadly enemies of canary birds, goldfinches and other household pets. Many people have observed a bird in a state of excitement and

anxiety, plucking at himself continually, his feathers standing all wrong. In vain is his food changed, and in vain is another saucer of clean water always kept in his cage, and all that kindness can suggest for the little prisoner done, but still all is of no use: he is no better, because the cause of his wretchedness has not been found out. If the owner of a pet in such difficulties will take down the cage and look up to the roof, there will most likely be seen a mass of stuff looking much like red rust as anything, and thence comes the cause of the poor birds' uneasiness. The red rust consists of myriads of parasites infesting the bird and for which water is no remedy. By producing a lighted candle, and holding it under every particle of the top of the cage till all chance of anything being left alive is gone, the remedy is complete. The pet will soon brighten up again after his "house-warming," and will, in his cheerful and delightful way, thank his master or mistress for this important assistance.

DOGS, Management of.—All dogs are capable of education, although it is certain that great difference in intelligence is known to exist between individuals even of the same species. There are stupid dogs and clever dogs, as there are clever and stupid members of the human family. Clever or stupid, however, dogs kept in a dwelling-house ought to be taught good manners; to be silent, and to lie down when so ordered; to refrain from leaping on the knees of strangers; and not to sit watching and staring at meals, as if coveting the food partaken of by their master and mistress. To make them behave well, they must be taught when young; and one of the best modes of doing this is to let them be certain of being punished if disobedient, and rewarded when dutiful. A clever dog will soon be able to comprehend and act upon a look, a sign, or a word.

DOGS, Feeding.—The dog is naturally carnivorous, but when domesticated he does not refuse farinaceous food, especially if early accustomed to it. Those who keep dogs ought not to leave their feeding to the scraps they may chance to obtain at the breakfast or dinner table; moreover, irregular supplies are injurious to the animal's health. The dog ought to have his regular meals, and his food should be chiefly flesh of some kind, boiled and cold; when given raw, it is apt to produce some ferocity of temper, and to cause him to have an offensive smell. If possible, the dog should be induced to eat some farinaceous food along with his meat. Liver is not proper food for a dog, unless occasionally, as it acts as an aperient; but any ordinary pieces of meat or tripe will suit very well. The dog ought to be fed only once a day if he gets as much as he requires, and this allowance should be given in the morning or forenoon; but as he requires to drink frequently throughout the day, care must be taken to give him plenty of pure water.

DOGS, To Keep Healthy.—To maintain a dog in vigorous health he must have abundant exercise in the open air, and be kept clean. Washing him keeps him in health, frees him from irritation of the skin, and destroys fleas. Every house-dog or lap-dog ought to be washed once a week with soap and water, and delicate dogs ought afterwards to be combed and brushed and dried with a hard cloth. Washing is absolutely indispensable—independently of the consideration

of health—where the dog has a thick coat of hair, as the Scotch terriers have; he is apt to contract an offensive smell, the causes of which, for the animal's own sake, as well as his owner's, ought to be at once removed. When soap is used in washing, a thorough rinsing must follow, for if there is the least particle of soap left, it will prevent their licking themselves.

DOGS, Teaching to go Errands.—This accomplishment may often be put to great practical use, and it is an excellent plan to teach all dogs, which are large enough to be of any service in this manner, to carry baskets or parcels when accompanying their masters. The mode of training is very simple, consisting of merely placing the articles in the dog's mouth, and when he lets go of it give him a slight box on the ear and replace the article in his mouth. Whatever is given him to carry should be of such a form as to be grasped easily by him without hurting his mouth or teeth. The weight should at first be very light and never more than he can easily carry. Most dogs will take a real pleasure in carrying articles in this manner, and they seem to feel the responsibility attached to their duty, for they will carry their own or their master's dinner without attempting to appropriate any portion of it until the proper time when their share shall be given them. In teaching dogs to carry food, however, it is necessary to take a little special pains to overcome their instinctive inclination to eat it. A good plan is to place the articles in a covered basket which they cannot open, and when the dog has learned to carry an ordinary parcel give him this. If he attempts to get at the food, which he readily detects by his sense of smell, box his ears. By-and-by reward him with the food, and then try him with a basket from which he can abstract the contents; if he tries to do so punish him slightly, never permitting him to steal the food. If a dog ever deserves a reward for well doing he certainly does in this case, for it is too bad to tantalize him with the smell of some dainty and then not to let him finally have something for his good conduct.

To make a dog carry articles from one person to another it is only necessary for two persons to take their position at some distance from another. One gives the dog some article saying "go sir," at the same time. As the first says this, let the other person call or whistle to the dog. Now let this one give the dog something and let the other one call him, and so on back and forth until he will go from one to the other at the command, "go sir."

It is not very difficult to teach a dog to go on errands. Suppose you wish him to go to market for you of a morning; take him with you regularly for a few mornings, letting him carry the basket. In a few days he will understand when you start where it is you propose to go, and will, perhaps, run on ahead and arrive there some minutes before you do. It would be well on all occasions before starting to give the command, "Go to market," which will accustom him to it.

DOGS, Hydrophobia, Rabies or Canine Madness in.—One of the earliest symptoms of rabies in the dog is restlessness. He is constantly running round and round before he will lie down; his countenance becomes anxious; his eyes bloodshot; he fancies that he sees objects around him which have not real existence, and he snaps at the empty air; his fondness for his master in-

creases, and with it his propensity to lick the hands and face—a filthy practice at any time, and one most dangerous;—the appetite becomes depraved, his natural food is neglected, and, at the same time, every sort of filthy trash is greedily devoured; eating his own excrement is an early symptom, and so sure a one, that the moment a dog is seen doing so he should be destroyed, or, at all events, carefully confined. For no curative treatment will avail, when a dog is seized with this terrible disease.

DOG, How to tell the Age of, (Until 6 Years of Age.)—A dog has a very visible mark in his teeth, as well as a horse, which mark does not disappear totally until he is very near or full 6 years old. Look to the 4 front teeth, both in the upper and lower jaw, but particularly to the teeth in the upper jaw, for in those 4 front teeth the mark remains the longest. At 12 months old you will observe every one of the 4 front teeth, both in the upper and under jaw, jagged and uneven, nearly in the form of a fleur de lis, but not quite so pointed at the edges of the jags as a fleur de lis is. As the dog advances in age these marks will wear away, gradually decrease and grow smoother and less jagged every year. Between 3 and 4 years old these marks will be full half worn down, and when you observe all the 4 front teeth, both in the upper and lower jaw, quite worn smooth and even, and not in the least jagged, then you may conclude that the dog is nearly if not full 6 years old. When those marks are worn quite flat and even, and those teeth quite level and even, you can no longer judge the age of a dog.

DOG (PUPPY), How to Choose.—Sportsmen assure us that, in order to make choice of a puppy from among a number of others, it is better to leave the choice to the mother herself. In carrying them back to their bed, the first one she takes up will always be the best; if we pretend to set fire to the bed on all sides, then the one she will try to rescue first.

DOGS, Best Bed for.—The best bed which can be made for a dog consists of dry, newly made pine shavings, a sackful of which may be had for a shilling at almost any carpenter's shop. The dog is delighted in tumbling about in them until he has made a bed to suit himself. Clean wood shavings will clean a dog as well as water, and fleas will never infest dogs that sleep upon fresh pine shavings; the turpentine and resin in new pine soon drive them away.

DOGS, Eggs Eating.—To cure this, blow an ordinary hen's egg, expelling the entire contents, stop up one end of the shell with wax. Then fill it from the other end with strong spirits of ammonia, or 'Hartshorn.' Seal that end and then put it where the dog can get it. If he crushes it, he will never be desirous of repeating the luxury of egg eating. After the dog has had one ammoniacal feast, a little of the fluid poured into the nest, will remind him of the fact, that he once was burnt, and also will serve to cleanse the nest from vermin.

DOGS (White,) to Wash.—Make a good lather of white soap with a little spirit of turpentine; wash the dog as quickly as possible in this while it is warm, but not hot, taking care not to let the soap lather get into its eyes. Have a tub with clean tepid water in which a little blue has dissolved, ready; when the coat is clean dip the dog into the blue water and rinse out the soap

Then rub it well in a clean sheet before the fire; if the hair is long comb it out and brush it as it dries. The turpentine will kill fleas unless the dog is much infested with them.

DOG DISTEMPER, Remedy for.—Distemper in dogs is characterized by a running from the nose and eyes, and a short dry cough, followed by a wasting of the flesh, and loss of strength and spirits. At length the brain suffers, and fits, paralysis of the extremities, or convulsions come on. A handful of common fine salt thrown down the throat and the mouth kept closed until it goes down, is an infallible remedy. One dose is enough in the early stage of the disease; if given later, it may have to be repeated.

DOGS, Fleas on.—Suds made from carbolic soap will rid a dog of fleas. An other remedy is to rub olive oil into the dog's coat, so as to saturate the hair to the surface of the skin; then to let it remain on for half an hour, and wash it well out with the best yellow soap and warm water. A small portion of any sweet oil brushed into the coat of a woolly dog will effectually prevent its being infested with vermin.

DOGS, Mange in.—Is similar to the itch in man and require the same treatment. Wash with soft soap and apply sulphur ointment.

DOGS, Worms in.—Are a frequent cause of fits, and when they get into the nostrils, wind-pipe, &c., generally cause death. For those in the bowels, Youatt recommends powdered glass made up into a roll with butter or lard. Cow-hage (cow-itch, mucuna) is probably quite as effectual, and is safer. A teaspoonful may be given in lard, and repeated if necessary. Turpentine should not be given to dogs.

GOLD FISH, How to Breed.—The following is the experience of a well known naturalist. He says: In the spring I put into one of my tanks, two feet long, one foot wide, and six inches deep, with a rustic basket in the centre filled with gravel, and planted with watercresses and other water plants, three gold-fish, two females and one male. Going into the room one day I observed the water, which had always been clear, very muddy. Seeing the water in such a disturbed state, I at once knew that spawning was going on. I looked with a microscope and saw a number of little golden balls sticking on the roots of the cresses. The thought struck me that, if I removed the ova, I could breed them, as the fish are known to devour their young. I put a handful of gravel and some weeds into a glass sugar-basin. I then, with a pair of tweezers, picked off the roots, with the ova sticking on them, and put them into the basin. In eight days I had a shoal of little fishes.

GOLD FISH, Care of.—Gold fish may be kept ten or twelve years in vessels—the average period of existence—by the following precautions:

1. Allow not more than one fish to a quart of water.
2. Use the same kind of water, whether spring or river water, and change it daily in summer; every other day in winter.
3. Use deep rather than shallow vessels, with small pebbles on the bottom—to be kept clean,—and keep them in the shade and in a cool part of the room.
4. Use a small net rather than the hand while changing the water.
5. Feed the fish with cracker, yolk of egg, lettuce, flies, etc., rather than with bread, and then only every third or fourth day, and but a little at a time.
6. Do not feed them at all from November to the end of

February, and but little during the three following months.

GUINEA-PIG, The.—This little animal, although called by the name of "pig," is in no way whatever related to the family to which the wild boar and the domestic hog belong. It is, on the contrary, comprehended in the order Rodentia, along with mice, rats, squirrels, and the various kinds of animals remarkable, as the name of the order implies, for their habits of gnawing. The guinea-pig is a native of Brazil and Paraguay, where it is found wild; and there are various species of the same animal. When domesticated in this country, it very much resembles the rabbit, although it is smaller in size. It is frequently marked with irregular patches of black, white, and orange. The ears are round and almost naked, the feet are short, and there is no tail. It is a very cleanly animal, and the male and female spend much of their time in licking and smoothing each other's fur. It breeds at two months old, and brings forth from four to twelve young ones at a time. It is a pretty little animal, but can hardly be said to make a desirable pet, as it seems entirely devoid of attachment. In order to keep the little creature in comfort, the chief object, besides that of furnishing it with appropriate food, is to keep it scrupulously clean,—an object which its own instinctive habits ought to suggest to its owner.

LINNETS.—Cock-birds are browner on the back than the hens, and have some of the large feathers of the wings white up to the quills. Canary and hemp-seed, with occasionally a little groundsel, water-cress, chickweed, etc., constitute their food.

MOCKING BIRDS, Food for.—Mix thoroughly together corn meal, pea meal, each one part; moss meal, half a part; add to the mixture enough melted lard not to make it too fat or greasy, and sweeten with molasses. Now fry this mixture in a frying-pan for about half an hour, stirring it all the time, and being very careful not to let it burn. If not fried sufficiently, it will not keep. When properly made it will keep in a covered glass jar for several weeks. Mocking, and other birds of similar nature, will leave all other food for this, which is rather healthful than injurious to them. Pea meal is made by drying split peas in an oven, and then finely grinding them in a mill. Moss meal is prepared from the moss seed imported into this country from Germany.

MOCKING BIRDS, To Trap.—The best way to catch them is to have a cage with two or three separate compartments, in one of which you have a decoy bird. The cage is to be set down near a bush, away from other undergrowth, in a locality resorted to by the birds. Cut three or four twigs and revolve them in bird lime until entirely covered, then cut a slit in the butt, and fasten to the most prominent part of the bush by this slit, then retire 150 yards. The decoy will begin to sing, thereby attracting the wild mocking birds, who will attempt to whip him away. They will probably light on the prepared twigs and will be held fast; their flutterings only causing their wings to stick likewise. A little lard rubbed on their feet and wings will remove the bird lime.

It will be found that the birds improve in strength and fullness of tone when kept some years; and it is not so difficult to keep the

bird as is generally supposed. Feed regularly, keep cage clean and dry, do not let victuals get stale or sour.

Another method is about the first of May to take a tramp through the woods and along the hedges until you find a nest, and be sure it is the right kind. Do not touch the nest, but visit it every few days, and when the young are hatched and can open their eyes and mouths take the nest and birds home with you and set them in a cage. You then prepare some corn meal very soft and feed them every half hour by putting it in their mouths; when hungry they will open their mouths and cry if you approach them, then is the time to feed them; when they become strong enough to hop about the cage you may then put water and the meal in the cage and they will soon learn to feed themselves. The cage should be cleaned out at least every other morning and fresh dry clean sand put on the floor. The regular feed of the birds should be corn meal and hard boiled eggs mashed together with a little water; scalded fresh beef is very fine for them, also a few polke berries occasionally, all kinds of fruits, bread that is not "short," meat not salt; never give them anything sweet. I nearly lost a fine bird by allowing him to get some sour molasses. The best medicine for the mocking bird is two or three spiders.

Be sure to put a pan of fresh water in the cage every day, as he is a great washer and invariably sings better if you give him plenty of water and spiders. The bird should never be let out of the cage, and he then does not know what liberty is.

PARROTS, Cages for.—The first requisite for all parrots is a strong roomy cage. The "Indestructible Cage," made of corrugated wire, with perches of lignum vite, is the best, as they are most destructive birds, and delight in mischief. If it be possible to find a loose wire or a weak spot in the cage, it is worked upon with beak and claws till it is quite destroyed. Macaws and cockatoos are chained to a perch by the leg, and two little tins, one containing food, the other water, are fastened to the perch, and a large flat tin underneath contains gravel, which is indispensable to their health. All parrots must be kept in a warm room during the winter; they are natives of the tropics, and in this climate are extremely susceptible of cold, and should be carefully guarded from draughts, which often produce asthma, of which disease a large proportion of parrots in confinement die; at the same time they require a good deal of fresh air and water, both to drink and bathe in. A parrot ought to have a bath, at least once a week in summer, and if the bird will not bathe himself, he should have tepid water poured over him from a watering-pot; he should then be set in the sun or before a fire to dry, and great care must be taken that the cage is perfectly dry. Parrots are subject to gout, and sometimes lose their toes from this disease, which is brought on by damp.

PARROTS, Food for.—Wild parrots live on grain, fruit, and nuts of various kinds; the food of the tame bird is much the same,—Indian corn, boiled and allowed to become cold, and canary seed. They are very fond of hemp seed; this last is, however, too heating for general use. Ripe fruit, and nuts of any kind, they may have in moderation; a bit of dry mealy potato, a crust of bread or toast, is also a great favorite with

some; and a little white bread, soaked in fresh milk with some sugar, should be given once a day, just as much as the bird will eat at one time. If the food is allowed to remain in the cage it will get sour, and it is then most prejudicial; in fact, parrots are like children, some prefer one thing and some another. But one rule must be scrupulously observed—never give them meat, no matter how small the quantity, it is always hurtful; and, indeed, butter or grease of any kind is very objectionable. With ordinary care these birds live to a great age, and they are so amusing, and often so affectionate, that it is a sad affair to lose one by carelessness.

PARROTS, To Teach how to Speak.—The quickest way is to send the bird, if possible, where there is another parrot who can speak. They should be placed near enough to hear, but not see each other, and the one will soon imitate the other. A good way is to speak to the bird at night; just when his cage has been covered over (which must always be done with a woollen rug in winter) repeat over several times in the same tone the sentence you wish him to learn. He may not appear to notice at first, but some day, quite unexpectedly, he will repeat the sentence exactly in the same tone that he has heard it. He should at once be rewarded with a bit of sugar, or fruit, any little dainty that he is fond of. They are very quick at understanding that rewards are given for obedience. We have had a grey parrot for many years; he is now fully sixteen years old; his plumage is beautiful and his health most excellent, and he is a most amusing and clever bird; he speaks exceedingly plain, and it is quite easy to teach him a new sentence, or even to make him repeat words and whistles when desired. He knows that he will be rewarded if he does what he is told, and be scolded if he is disobedient. Never allow a parrot to be startled or teased, or permit it to be fed indiscriminately by visitors. Keep the cage extremely clean; let it be wiped out and fresh sand given every day. Some birds drink very little, but they should always be able to get a drink of fresh water if they wish. It is also a good plan to let a small quantity of canary seed be in the seed can. If a bird is left to the care of a servant during absence, it is possible that the morning bread and milk may be forgotten, and the seed will thus prevent the bird being starved.

PARROTS, To Prevent Plucking its own Feathers.—The morbid condition of the bird may be induced from one or both of two causes. The bird may be suffering from an accumulation of parasites upon its body; the cage may be infested with them, especially in the corners and crevices of the wood of the perch. Those insects crawl upon them and usually infest the head, neck, and under the wings, and the poor bird may be simply trying its best to get rid of them; or the blood of the bird may be in a highly inflammatory condition, probably induced by excess of kindness, in pampering its appetite by feeding upon dainty morsels but ill suited to birds, by which at length they will almost refuse their natural food. If such is the case, gradually leave off giving the bird those tidbits compelling it to feed upon those seeds only suited to its condition, and it will soon recover. If it is caused by insects the cage must be well cleaned; place a drop of turpentine in each corner of the cage, and upon

the perch, this will soon destroy them; and rub a little train oil upon the bare part of the bird's body, or dust the body well with some insect powder (pyrethrum rosea).

ROBIN, How to Tame and Feed.—If we wish to tame a robin, one of the most pleasant of home pets, it must be done very gradually, making great friends with a young bird, and feeding it, when it will often come contentedly to roost indoors, in the colder weather, and will cheerfully introduce its small brown brood, to hop about before us on the gravel walk, later in the season. And one tame robin will then bring in another, when they are at peace, which is very rare. A young bird brought up from a nest is a most agreeable pet. He ought in that case to possess a cage, but to be allowed to go in and out at will. When confined, water should be kept in some convenient locality so that he can take his bath when ever he wishes it. Old birds should never be caught for the purpose of taming or confining.

Robins eat hard-boiled eggs, bread crumbs, German paste, hemp and canary seed, and must have abundant water.

RABBIT, Habits of the.—The rabbit litters four or five times a year, bringing forth from five to eight young ones at a time, and beginning to breed at the age of six months. The animal delights in a sandy soil, with a superficial layer of fine vegetable mould, clothed with thyme, fine grass, and other herbage. In such situations it can easily make its burrows, and enjoy abundant food. It is remarkable that while the young of the hare are born covered with fur, and possessed of sight so as to be able to shift for themselves, young rabbits are born blind, naked, and helpless; they cannot see for about twelve days after birth, nor leave the burrow for more than a month.

RABBITS, Best Kinds of.—Stout, short-legged rabbits are better breeders than others, as well as more healthy. The large hare-colored variety is much esteemed, but the white, or white mottled with yellow or black, is said to be the most delicate for the table. The grey is said to approach nearest to the flavor of the wild rabbit. Rabbit fanciers have different opinions as to the colors of the animals. Grey, as being the commonest, is held in least estimation; the black occupies the next place; the fawn, the white, and

grey hold the third place; the pure albino with pink eyes is considered better than any of these; various admixtures of brown, grey, or black mixed with white, take the highest rank, and a uniform mouse color is greatly admired by a few as superior to any other.

RABBITS, To Rear.—It is of great importance that the rabbitry be properly adapted to the purpose intended. The rabbit in its natural state prefers a dry and airy situation, and the rabbit-house or hutch ought, on that account, to be kept always dry, clean and well aired. The hutch may be most suitably placed against the south wall of a house, so as to obtain the advantage of the sunlight. It should be surrounded by a wire fence, and, in the interior of the enclosure, boxes ought to be fixed as breeding places, separated by partitions from other boxes adapted for the young rabbits, which partitions are furnished with doors capable of being closed so as to separate the young ones from the parents when required.

RABBITS, To Feed.—It ought to be kept in mind that all the various vegetables and roots used at table may be given to them, and that perhaps celery, parsley, and the tops as well as the roots of carrots are preferred by the animals; lettuces, stumps of cabbage and cauliflowers, turnips, and parsnips, are all useful. In spring, tares are excellent, and the dandelion, the milk thistle, and sow thistle, are all much relished by them.

SQUIRRELS, How to Manage.—In a domestic state these little animals are fed with hazel nuts, or indeed any kind of nuts; and occasionally bread and milk. They should be kept very clean.

THRUSHES.—A cock may be distinguished from a hen by a darker back and the more glossy appearance of the feathers. The belly also is white. Their natural food is insects, worms, and snails. In a domesticated state they will eat raw meat, but snails and worms should be procured for them. Young birds are hatched about the middle of April, and should be kept very warm. They should be fed with raw meat, cut small, or bread mixed in milk with hemp-seed well bruised; when they can feed themselves give them lean meat cut small, and mixed with bread or German paste, plenty of clean water, and keep them in a warm dry, and sunny situation.

HOUSEHOLD PESTS.

ANTS, To Destroy and Banish.—1. Perfect cleanliness.—2. Pulverised borax sprinkled in places they frequent.—3. A few leaves of green wormwood, scattered among their haunts.—4. The use of camphor.—5. A sponge can be sprinkled with sugar and laid upon shelves when ants are numerous; the next morning plunge quickly into boiling water, and most of the intruders will be destroyed.—6. Carbolic acid wiped around the edges of the shelves and wherever they seem to come from.

BED-BUGS, To Exterminate.—1. Perfect

cleanliness. No bed-bugs or other vermin will infest a house, the mistress of which, is of orderly and cleanly habits, and fine tastes.—2. Two ounces of red arsenic, a $\frac{1}{4}$ of a pound of white soap, $\frac{1}{2}$ an ounce of camphor dissolved in a teaspoonful of spirits rectified, made into a paste of the consistency of cream. Place this mixture in the openings and cracks of the bedstead.—3. Where bed-bugs are present the best, quickest and handiest exterminator is kerosene or crude petroleum oil, drenching all parts of the article of furniture thoroughly and effectively.

CATERPILLARS, To Destroy.—Boil together a quantity of rue, wormwood, and any cheap tobacco (equal parts), in common water. The liquid should be very strong. Sprinkle it on the leaves and young branches every morning and evening during the time the fruit is ripening.

CRICKETS, To Destroy.—A single cricket in the kitchen grate will disturb a household. There is a superstition which prevents uneducated persons from attempting the destruction of the insect. It flaps its wings, producing its well-known sound, chiefly at night. A little ginger cordial being placed in a dish before the fire will attract it, and on partaking of the liquor it will die. The best mode of destroying the insect in its nest is to put snuff into the chinks of the grate.

COCKROACHES AND BEETLES, To Destroy.—1. Strew the roots of black hellebore, at night, in the places infested by these vermin, and they will be found in the morning dead, or dying. Black hellebore grows in marshy grounds, and may be had at the herb shops.—2. Put about a quart of water sweetened with molasses in a tin wash basin or smooth glazed china bowls. Set it at evening in a place frequented by the bugs. Around the basin put an old piece of carpet that the bugs can have easy access to the top. They will go down in the water, and stay till you come.—3. Take pulverized borax 4 parts, flour 1 part, mix intimately and distribute the mixture in cupboards which are frequented by the roaches, or blow it, by means of a bellows, into the holes or cracks that are infested by them.—4. By scattering a handful of fresh cucumber parings about the house.—5. Take carbonic acid and powdered camphor in equal parts; put them in a bottle; they will become fluid. With a painter's brush of the size called a sash-tool, put the mixture on the cracks or places where the roaches hide; they will come out at once. Then kill.—6. Mix up a quantity of fresh burned plaster of paris (gypsum, such as is used for making molds and ornaments), with wheat flour and a little sugar, and distribute on shallow plates and box boards, and place in the corners of the kitchen and pantry, where they frequent. In the darkness they will feast themselves on it. Whether it interferes with their digestion or not, is difficult to ascertain, but after three or four nights renewal of the preparation, no cockroaches will be found on the premises.

FLEAS, To get Rid of.—Much of the largest number of fleas are brought into our family circles by pet dogs and cats. The oil of pennyroyal will drive these insects off; but a cheaper method, where the herb flourishes, is to throw your cats and dogs into a decoction of it once a week. When the herb cannot be got, the oil can be procured. In this case, saturate strings with it and tie them round the necks of dogs and cats. These applications should be repeated every twelve or fifteen days. Mint, freshly cut, and hung round a bedstead, or on the furniture, will prevent annoyance from bed insects; a few drops of essential oil of lavender will be more efficacious.

FLY, Nature and Habits of.—But of what use are flies? is the inquiry often made. They are scavengers, and delight not only in sweet things and fresh blood, but also in things unclean, especially in decomposing animal substances. With their proboscis, sucking up the juices which by

evaporation would contaminate the air, very useful indeed, in the houses of slovenly housekeepers. The blue-bottle, or blow fly deposits its eggs on animal substances, which are recognized as fly blows. In a warm temperature they hatch in three or four hours after they are laid, and then are called larvæ or maggots. Linnaeus asserts that the maggots from three flies will consume a dead horse as quickly as a lion. So voracious are they that they increase in weight about 200 times in 24 hours. The flesh fly, a little longer than the blow fly, drops living maggots on dead flesh, the maggots being hatched within the fly. The cheese fly is very small; of a shining black color, with transparent wings and yellow hind legs. It deposits about 200 or 250 eggs into the cracks in cheese, which are developed into skippers. The maggots of some species of flies spin cocoons; with others, the skin simply hardens and incases the pupa, or chrysalis. At length the fully developed fly makes its escape by forcing off with its head the chrysalis case. The different-sized flies, we notice, are different varieties, and not young and old, as some suppose; for flies never grow to any very perceptible extent. A large proportion of the swarms of flies generated during the warm weather of summer are destroyed by the frosts of winter. Only a few that are so fortunate as to find shelter and warm places escape; and in similar situations, some of them pass the winter in the chrysalis state, and only emerge when warm weather returns. The house fly is a domestic insect, and is said never to be found except in the vicinity of man's present or recent habitations.

FLIES, (House) To Destroy.—House flies are present just in proportion to the dirt and uncleanness there is in a house. The cleaner the house and surrounding, the fewer flies there will be.—1. They may be effectually destroyed by putting half a spoonful of black pepper in powder on a teaspoonful of brown sugar, and one teaspoonful of cream; mix them well together and place them in a room where the flies are troublesome, and they will soon disappear.—2. The butchers of Geneva have, from time immemorial, prevented flies from approaching the meat which they expose for sale, by the use of laurel oil. This oil, the smell of which, although a little strong, is not very offensive, drives away flies; and they dare not come near the walls or the wainscots which have been rubbed with it.—3. Flies are kept out of stables, (a place they propagate in great numbers) by using sawdust which is saturated with carbolic acid diluted—one part of acid to a hundred parts of water—the sawdust scattered about in stables keeps all flies away. A similar application of the acid ought to keep them from kitchens.

FLY PAPER (Adhesive).—Melt resin in any vessel over the fire, and while soft add to it enough sweet oil, lard or lamp oil, to make it when cold of the consistency of molasses. This spread upon writing paper with a brush will not dry in a long time and is so sticky as to hold fast the legs of any insect attracted to it, or accidentally coming in contact. It may be placed about the house, the pantry or elsewhere, and will soon attract and hold fast ants and other vermin. It is also used on table legs, the edges of shelves and other places to prevent the ascent of ants. Strips of this paper fastened closely about the trunks of trees, plants, etc., the varnish side out,

prevents the ascent of insects. It possesses the great advantage over the ordinary fly papers in that it is not poisonous.

MICE, To drive away.—Gather any kind of mint and scatter it about your shelves, and they will forsake the premises. See also "Rats".

MOSQUITOES, To keep out of a Room.—

1. Oil of pennyroyal, scattered about in small quantities.—2. Take of gum camphor a piece about one third the size of an egg, and evaporate it by placing it in a tin vessel, and holding it over a lamp or candle, taking care that it does not ignite. The smoke will soon fill the room, and expel the mosquitoes.—3. Jagor, a celebrated German traveller, who spent a number of years in the jungles of the Malayan Archipelago, recommended, the roots of pyrethrum roseum. In a paper recently published by Dr. Birdwood, on olibanum, the author says that in Bombay nothing so quickly clears one's room of mosquitoes as the burning of a little olibanum or myrrh in it.—4. Carbonic acid has recently been successfully used for the extermination of mosquitoes and flies. A small piece of cloth, saturated with the acid, was hung in the room, and in two hours the flies had entirely disappeared. In the evening the acid was tried in the kitchen where the mosquitoes were very troublesome, with like success.

MOSQUITOES, To prevent Biting.—Dilute a little of the oil of thyme with sweet oil, and dip pieces of paper in it. Hang in your room, or rub a little on the hands and face when going to bed.—2. It is said that petroleum is a good mosquito bar, if used in this way: A little coal oil is dropped on some raw cotton, the excess of it squeezed out, and the cotton then rubbed over face and hands. It is said that the little pests will not come near it. To us the remedy seems nearly as bad as the disease; to those who do not mind the smell of kerosene it may be useful.

MOSQUITOE BITES, Solution for.—Apply at once a few drops of aqua ammonia, or an infusion of tobacco, either of which will allay the itching almost instantaneously. Carbolic acid has also been tried, and with good success, but it should be very much diluted, to prevent producing a blister.

MOTHS, To preserve Clothing and Furs from.

—1. Procure shavings of cedar-wood, and enclose in muslin bags, which should be distributed freely among the clothes.—2. Procure shavings of camphor-wood, and enclose in bags.—3. Sprinkle pimento (allspice) berries among the clothes.—4. Sprinkle the clothes with the seeds of the musk plant.—5. An ounce of gum camphor and one of the powdered shell of red pepper are macerated in 8 ounces of strong alcohol for several days, then strained. With this tincture the furs or cloths are sprinkled over, and rolled up in sheets.—6. Carefully shake and brush woollens early in the spring, so as to be certain that no eggs are in them: then sew them up in cotton or linen wrappers, putting a piece of camphor gum, tied up in a bit of muslin, into each bundle, or into the chests and closets where the articles are to lie. No moth will approach while the smell of the camphor continues. When the gum is evaporated, it must be renewed. Enclose them in a moth-proof box with camphor no matter whether made of white paper or white pine, before any eggs are laid on them by early spring moths. The notion of having a trunk made of some particular kind of wood for this purpose, is non-

sense. Furs or woollens, put away in spring time, before moth eggs are laid, into boxes, trunks, drawers, or closets even, where moths cannot enter, will be safe from the ravages of mothworms, provided none were in them that were laid late in the autumn, for they are not of spontaneous production.

MOTHS IN CARPETS, To Kill.—Wring a coarse crash towel out of clear water, spread it smoothly on the carpet, iron it dry with a good hot iron, repeating the operation on all parts of the carpet suspected of being infested with moths. No need to press hard, and neither the pile nor color of the carpet will be injured, and the moths will be destroyed by the heat and steam.

RATS, Methods for Destroying.—1. Mix some fine plaster of Paris with an equal quantity of flour; put the mixture in the place infested by the vermin, and a vessel full of water beside it. The rats will devour the mixture, and then drink; whereupon the plaster, brought into contact with the water, will become solid, and like a stone in their stomachs, which will cause their death. This method is evidently highly preferable to the use of arsenic, which is always attended with danger.—2. Flour, 6 pounds; sugar, 1 pound; sulphur, 4 pounds; phosphorus, 4 pounds.—3. When a house is infested by rats which refuse to nibble at toasted cheese, and the usual baits, a few drops of the highly scented oil of rhodium, poured on the bottom of a cage top, will always attract before morning. Where a trap baited with all manner of edibles had failed to attract a single rat, the oil of Rhodium caused it to be completely crowded night after night.—4. Mix powdered nux vomica with oatmeal, and lay it in their haunts, observing proper precaution to prevent accidents.—5. (*Phosphorus paste.*) Take of phosphorus, 8 parts, liquify it in 180 parts of luke-warm water, pour the whole into a mortar, and add immediately 180 parts of rye meal; when cold, mix in 180 parts of butter melted, and 125 parts of sugar. If the phosphorus is in a finely-divided state, the ingredients may be all mixed at once, without melting them. This mixture will retain its efficacy for many years, for the phosphorus is preserved by the butter and only becomes oxydized on the surface. Rats and mice eat this mixture with avidity, after which they swell out and soon die.—6. Cover the floor near their holes, with a thin layer of moist caustic potash. When the rats walk on this it makes their feet sore. These they lick with their tongues, which makes their mouths sore, and the result is that they not only shun this locality, but appear to tell all the neighboring rats about it, and eventually the house is entirely abandoned by them, notwithstanding that the neighborhood may be teeming with them.—7. Corks, cut as thin as wafers, roasted or stewed in grease, and placed in their tracks; or dried sponge in small pieces, fried or dipped in honey, with a little oil of rhodium, or bird-lime, laid in their haunts, will stick to their fur and cause their departure. If a live rat be caught, and well rubbed or brushed over with tar, and train-oil, and afterward put to escape in the holes of others, they will disappear.—8. Cover a common barrel with stiff, stout papers, tying the edge around the barrel; place a board so that the rats may have an easy access to the top; sprinkle cheese parings or other "feed" for the rats on the paper for several days, until they begin to believe they have a right to

their daily rations from this source. Then place at the bottom of the barrel a piece of rock about six or seven inches high, filling with water until only enough of it projects above the water for one rat to lodge upon. Now replace the paper, first cutting a cross in the middle, and the first rat that comes on the barrel top goes through into the water and climbs on the rock. The paper comes back to place, and the second rat follows the first. Then begins a fight for the possession of the dry place on the stone, the noise of which attracts the rest, who share the same fate.—9. Fill a deep smooth vessel of considerable capa-

city, to within 6 inches of the top with water, cover the surface with bran, and set the vessel in a place most frequented by these pests. In attempting to get at the bran, they will fall in and be drowned. Several dozen have been taken by this simple method at a time.—10. The smell of a goat is obnoxious to the nostrils of rats; the two wont be friends and companions on any account whatever, and the introduction of goats to one's barn or premises will cause an immediate stampede of all the rats.—11. The possession of a ferret is at once the safest and deadliest enemy of the rat.

HUNTING, TRAPPING AND TANNING.

BEAVER SKINS, To Dress.—You must rip the skin the same as you would a sheep. Stretch it in all ways as much as possible; then it is to be dressed with equal parts of rock salt and alum dissolved in water and made about as thick as cream by stirring in coarse flour. This should be spread on nearly half an inch thick to be scraped off when dry and repeated if one time is not enough. This same process of dressing applies likewise to otter skins.

BIRD LIME.—1. The middle bark of the holly, any quantity; boil it for seven or eight hours in water, or until it is soft and tender, then drain the water off, and place it in pits under ground, surrounded with stones; let it remain to ferment, and wash it if required until it passes into a mucilaginous state. Then pound it well and wash it in several waters, next leave it for four or five days to ferment and purify itself.—2. Linseed oil boiled and burned down to a thick varnish answers even better than the above. In preparing it the oil is put into an iron kettle and set upon a fire, when warm it is lighted also and allowed to burn until it is of the destined thickness. The iron pot should not be over one-third full of oil, and should have a lid to fit pretty closely by which the oil can be quenched at will. From time to time this must be done to ascertain the condition of the oil. It takes from nine to ten hours to boil it down, and when done it should be put away in a vessel as nearly air-tight as possible, otherwise it will continue to grow thicker and thicker until it becomes unusable. It should be of the consistency of thick syrup.

BIRD LIME, How to Use.—There are various methods of using it. It can be either employed on sticks made for the purpose, by which means there is not so much loss of bird lime, or plastered on spots to which the birds are accustomed to come. If used in the former way, holes must be bored into the tree in which to fix the limed sticks. Birds taken with lime should be relieved as soon as caught, or they will flutter themselves to death. Alcohol will wash off the lime. But take care in applying it; small birds can be killed with the smell of alcohol. If their heads are not limed, cover that part of them with a silk handkerchief and use a sponge to wash off the lime.

BIRD CATCHING, English Secrets of.—"Jingling for robins" is a simple art, but it is founded upon close observation of nature. The jingler provides himself with a tame robin caged; a piece of timber about a foot square, to which is attached a net, which flies over it at the proper moment by means of a spring; and two penny pieces. He selects a rural spot, deposits the cage on the board at the foot of a tree, retreats to a little distance, and then balancing the pennies, one on each forefinger, chinks them together. Now, if there is such a thing as a cock-robin in the vicinity, he immediately exposes himself. Birds, like men, have their weaknesses, and jealousy and inquisitiveness are the especial weaknesses of cock-robins. "Chink, chink," is the call note of the male bird to his mate; and an unwonted "chink" affects him to that degree, that he is almost thrown off his perch. His even bright, round eyes, grow rounder and brighter, with all the keenness of curiosity and the greenness of green eyed jealousy. "Chink, chink," go the pence. The deluded bird sets his head awry; and he says in his heart, "What does this mean, I should like to know." "Chink, chink! Chink, chink!" he can stand it no longer. His quick vision has detected the bird in the cage, and he sweeps down to demand an explanation of the stranger's intentions, and may be to require immediate satisfaction. But, alas! no sooner does the victim of his own passions alight on the board, than the spring that hitherto withheld the net is released, and encloses both the caged bird and the wild one.

"Trolling for larks" at night. Selecting a meadow which larks are known to frequent, the snarers provide themselves with a long net. This is loaded all down one side with stones or leaden weights, to keep it close to the ground. Stretching the net out to its fullest extent, two men take a corner of the side that is not weighted, and slowly drag the field, until the fluttering and screaming of the poor little prisoners tell them they have had a good haul. All in the dark the men go on their knees, and thrusting their hands through the meshes, make their captures, which they slip into store cages. These are long wooden cages, with a round hole cut in the top,

to which is fastened the leg of a stocking, which hangs loosely inside, thus making it an easy affair to drop the larks, and an impossible one for them to get out again. It generally happens that as many larks are taken dead as alive by this system. Indeed it is almost impossible to take them at all, except with the assistance of two horses. This is explained by the fact that the sense of hearing is very acute in the lark—the slightest noise, if it be of an unusual character, alarming them. Now larks are used to the tramping of cattle, but not to the footsteps of men; sometimes, therefore, the snarers take each one of the dragging ropes in their hand, and lead a horse by the bridle with the other; the birds are undisturbed by the tramping of the four footed creature, and the bipeds, keeping step with the horses, are not detected.

The metropolitan bird catcher is not content with larks—he must have nightingales also; but none but the most enthusiastic bird catchers are addicted to this branch of the business, which is called "lying out." For in the first place, it is almost without excitement; and in the next, although the birds, when caught in prime singing condition, fetch a high price, the difficulty in catching them is so great as to make the trade unprofitable. This is how it is practiced. A trap exactly similar to the robin trap is used, only instead of a tame bird in a cage, a hook is driven in the center of the board and on the hook is impaled a lively worm. The first thing is to discover a bush frequented by a nightingale. You must watch him into the bush, allow him to pass the night there, and see him well off in the morning before you set your trap. Then you dig the ground up within a few yards of the bush and bury the trap so that only the writhing worm in the middle of the net attached is visible; the net being as much the color of fresh earth as possible. Then you must retire and watch for the chance of the bird spying out the worm when he hops down to look for food in the morning. If the worm happens to be still alive, and its wriggling attracts the attention of the nightingale, then you have a chance of catching him; if not, you must wait until this lucky collusion of circumstances does occur.

"Pegging for chaffinches" is by far the most curious and interesting of all the branches of the bird-catching art. Before you think of going pegging, you must get a thorough good pegging chaffinch. These birds are trained to the business. As soon as the new year's bird gives sign of coming into song (which you will know by the beak turning blue), you must put the cage in a stout black bag, and hang him up in his usual place. He will perhaps sulk a little at first; if so, he will require a little encouragement. It is astonishing what odd noises will bring him out—the rasping of a tobacco pipe on the back of a knife, the frying of beef steaks, or scraping a bow on a fiddle. In a little time he will pipe away as well in the black bag as he would out of it. Then, by degrees you must use him to being handled. Stand his cage on the table at your elbow, carry him about the house, or in the garden, and if he will stand all this, and sing as he goes, you may venture a pegging trip with him.

Besides the decoy bird, you will require a stuffed chaffinch—or "stall"—looking as much like life as possible. Then you must have half a

dozen pegs. These are made of whalebone, and must be eight inches long, and about as thick as an ordinary meat-skewer, fixed with the pointed half of a stout needle in one end.

Then you want some bird lime, and good bird lime it must be, or all your other preparations are of no avail. It should be so plastic that a piece the size of a small pea may be drawn out in a thread half a yard long.

A bright, warm May morning is the best time; and, supposing you to have everything in perfect order—the pegs, the stall, the lime in a little tin box, and your decoy in his cage, tied in a handkerchief of the most unobtrusive color—you start off. When you get among the trees, you will presently hear perhaps one, perhaps two, chaffinches piping away over your head. Now to business. Mark the tree that contains the stoutest singer, take out your pegs and lime, fasten the stuffed bird securely to one of the pegs, and then smear another peg all over with bird lime. Stick the perch on which is standing the stuffed bird firmly into a tree adjoining the one containing the wild songster; and, about six inches above the "stall," drive the limed peg. Place the decoy (still in the handkerchief) at the foot of the tree. If he is a good bird, the singing of the wild chaffinch will stimulate to the utmost his exertions to drown the voice of the other; if he is a coward, the wild fellow is the conqueror, and the trained decoy will whine and chirrup pitifully. However, supposing him to be "a good brazen bird," the wild chaffinch will gradually work himself into a rage, and fluttering here and there—screaming out his notes in defiance—to find the intruder. Presently his eye catches the stuffed bird on the peg; and has not the least doubt but that he has discovered the delinquent; with an angry cry, down he swoops sheer on to the stuffed bird's back; the sticky peg just above catches his pinions, and either he hangs there, or he brings the peg down with him, and runs screaming along the ground till you overtake him.

BIRDS, To Preserve.—Birds may be preserved in a fresh state for some time by removing the intestines, wiping the inside out quite dry with a towel, and then flouring them. A piece of blotting paper, on which one or two drops of creosote have been placed, is now to be put inside them, and a similarly prepared piece of paper tied round them. They should then be hung up in a cool dry place, and will be found to keep much longer than without undergoing this process.

BIRDS, To Skin and Stuff.—A great assistance in skinning animals is to suspend the body by a hook, so that both hands are at liberty. For small kinds a common fishhook will answer, with the barb broken off, and a cord attached a foot or two in length. This may be inserted among the bones near the tail after the skin has been partly detached.

Other implements required are the following:

1. A sharp knife, of almost any shape, but a surgeon's scalpel without a jointed handle is the best for small kinds, and the common butcher-knife, which is of similar shape, for larger ones.
2. A strong, sharp pointed scissors, and for large skins, a shears is often useful.
3. Triangular glovers' needles, for sewing up skins; two or three sizes.
4. A pair of spring forceps, such as are used by surgeons, though not essential, are very useful.

5. A tape measure, three to six feet long. 6. A fine saw, or coarse flat file, to notch small bones before breaking them, so as to break them evenly. Some use sharp-edged nippers for this purpose. Large bones may be broken roughly, and the ends smoothed off. When a bird is shot, all large holes must be plugged with cotton or paper, and this also inserted in the mouth and throat, so as to prevent the flow of blood or other fluids. Blood on the feathers may be absorbed by sprinkling with plaster of Paris, ashes, dust, or sand, shaking off all that does not stick; then make a cone of paper, large enough to put the bird in, head down, and twist up the other end over it, taking care not to injure the tail feathers. This will secure smoothness of the feathers when the body stiffens. In cool weather it is best to postpone skinning for twelve to twenty-four hours, in order to allow the blood to coagulate, so that it will not flow so freely, and the fat hardening, also gives less trouble. Some use a ring of paper pinned round the body to obtain its exact girth, so that it can be stuffed out to the same dimensions afterward.

Before skinning, put fresh plugs in the mouth, nostrils, and large shot-holes. Take the measurements and notes required; then make an incision from the breast-bone down to the tail, not so deep as to open the intestinal cavity, and carefully separate the skin on each side, plugging or sewing up any holes accidentally cut too deep. If blood or fluid run too freely, absorb them by some dry ashes, plaster, or paper, and use these so as to protect the feathers; if necessary, keeping the fingers well powdered. Separating the skin from one side, the leg is soon reached; this must be drawn out by the knee-joint as far as it can be, and the tendons cut where they go toward the foot. Break off the bone within the skin, and, having freed that leg, treat the other in the same way. It is most convenient in small birds to break these bones, and also those of the upper wing-joint, before beginning to skin, thus having the limbs less in the way.

After the legs are freed, cut down to the tail, and separate the body, leaving some of the vertebrae attached to support the feathers. Remove the oil-glands above the tail carefully from the skin, then insert the hook in the body, and hang it up, head downward. The skin is then easily peeled off until the wings are reached, when it must be drawn to one side until the broken end of the shoulder-bones are reached, which may be slipped through the muscles, and pulled out as far as possible. The muscles must then be cut off, and this wing being freed, the same process is used for the other.

The skin then slips off easily as far as the head, and, if large, must be supported, so that its weight may not stretch the neck. In drawing it over the head, be careful not to tear it, and use the finger-nails more than the knife. The ear membranes are easily drawn out with it, and on reaching the eyes, the attachment of the lids must be carefully separated from the eye-ball, so as to injure neither the lids nor the eye-ball, as the fluids escaping give trouble. Then cut off the back part of the skull, remove the brains and the eyes, clear away all remains of muscle, etc., from the skull, and sprinkle or smear the skin with arsenic. Fill the eye-sockets and other cavities around the head with cotton or other stuffing, and draw the skin back to its original

shape. If the neck has dried during the operation, it will need moistening before retraction.

The second joints of the wings now require cleaning from the muscles, etc. This may be done in small birds by carefully drawing the skin down over the bones, loosening it with the finger-nails. Large birds, however, need an incision under the wing, reaching the whole length of the joint, which may be sewed up afterward by a few stitches. Arsenic ointment must be applied freely to all these parts. The wing-bones must now be connected by a string passed through the space between the bones, or a thread sewed through the ligaments, so that it can not slip. Do not draw the wings too close together, but leave as nearly the natural distance between them as is practicable. Cotton or tow may be now wound round the broken ends of the wing and leg bones, a roll of it inserted in the neck, and enough put in the body to fill it out to its natural shape.

When the legs are tied together, no stitches are generally necessary to sew up the cut. If there are large holes in the skin, they should be sewed up from the inside before putting in the stuffing. In large birds it is well to sew on wide strips of rag along the inner edges of the cut made in the skin to protect the feathers during the operation of skinning, removing the rags afterward. Very badly soiled skin can, however, be cleaned by the taxidermist; and, provided they have not lost any feathers, are still useful. The bill should generally be tied shut by a string passed through the nostrils, and the label may be put there or on the legs. Very long necks are best stuffed by rolling up a long cylinder of paper, and passing it down the throat or from the inside. The neck may then be bent down along the side of the body, and the legs bent up so as to make as compact a specimen as possible. Having smoothed down the feathers, the bird must now be pushed carefully inside a cylinder of stiff paper of the proper size, and laid on its back to dry. Hanging it up by the bill or feet stretches it too much. If carefully dried, it retains a good shape, and may be freely handled afterwards.

Some birds, especially ducks and woodpeckers, have the neck so slender that the head can not be drawn through it by skinning in the usual manner. In these an incision must be made on the most injured side, from the ear down far enough to allow the head to be cleaned through it. The body may then be skinned as usual, or the incision may be continued down the neck to the bare space under the wing, and the skin taken off without cutting it elsewhere. To sew this up requires care in order to adjust the feathers nicely, and the stitches must be taken from within outward. Some persons skin all birds in this manner; but the feather are more apt to fall out of those birds that have them loosely attached.

There is much difference in the ease with which a bird may be skinned, according to the relative toughness of skin, and adhesion of feathers. A humming-bird is more easily skinned than a pigeon, and those of the size of a robin take much less time than an eagle. For practice, the best are blackbirds and jays, those not too fat being preferable.

BIRDS, To Mount.—Lay the bird upon the table with the head to the left; having arranged the wings and legs to keep the bird in the right

position, place a weight on the tail. Brush the skin of the neck with the soap, then stuff with the flax, taking care not to distend it. Anoint the back as far as the rump, stuffing it one-third of the thickness, that the wire may rest on a thick layer of flax. Prepare four wires. One for the back which may be a little longer than the body; at about one-quarter of its length it should be twisted into a small ring, by the pincers, and pointed with the file at the extreme end; two others are to be cut somewhat longer than the legs. The tail wire is to be formed into an oval, in size, about one-third of the length of the bird's body, twisting it a short distance from the ends, that they may form a fork; the two prongs to be pointed and bent near enough together to enter the rump; the ends will be hidden under the tail, the oval to enter the body of the bird. The back wire being oiled, may now be introduced across the skull, passing into the back in the middle of the flax, so that the ring in this wire will be brought a little toward the anterior part, and can receive the extremities of each of the wires which have passed through the thighs and claws.

The leg wires are introduced by making a passage through the shank and bone at the thigh, by piercing them with an awl, the size of the wire. The wire must be passed in a straight line over the knee, and is to be brought to the little ring of the body wire, both leg wires and the end of the back wire are to be twisted together with the pincers, and be lowered toward the tail. The wires thus adjusted and resting on the flax, the skin must be well anointed and filled to its natural dimensions.

The body may now be sewed up with a fine glover's needle and sewing silk, with what is known as ball or carpet stitch.

If the orbits of the eye are not sufficiently plump, a little cotton may be added, moistened with the gum with which the artificial eyes are to be fixed. Give the eye a natural appearance having the lids well rounded and brought over the glass.

In fixing the bird to a standard its natural attitude should be copied as accurately as possible. The feet should not be too wide apart, the legs should be so bent at the knee-joints and the body so inclined forward that the root of the tail will be on an exact line with the knees. This forms the natural angle. The head may be inclined a little to one side. If the bill is likely to separate, a thread should be passed through the nostrils and tied beneath, until the bird is quite dry.

The feathers should now be carefully smoothed and arranged with a camel's hair brush, and the wings tied in a natural position, and the body should be bound with a little piece of muslin until every part is perfectly dry.

A little paper cone may be put over the head, to keep the feathers in place, for a few days.

Stuffed birds should be kept free from dust, in a moderate temperature, out of the sun. A common bell glass will answer to cover a single specimen or a small group. They should be frequently examined, for moths and insects are very apt to get into the feathers.

Five drops of Prussic acid, on a piece of cotton, placed in a case will effectually destroy insects.

BLEACHING WOOL ON TANNED PELTS.—Put an old pot or other iron vessel in the bottom of a hog'shead, and in the vessel a

roll of brimstone. Fasten near the top a stick or two, to place the skin on. The wool must be wet, when hung on the sticks. Heat an old iron red hot, or take live coals to start the brimstone. When it is burning briskly cover the hog'shead tight to keep the smoke in. In bleaching blankets we put them in after dinner and take them out next morning. If not white enough, repeat the process.

BUFFALO SKINS, Indian Mode of Tanning.—The hard and incessant labor that is necessary to properly 'Indian tan' a robe is not easy to realize unless one may see the work go on day by day from the first step, which is to spread out the pelt or undressed hide upon the ground, where it is pinned fast by means of wooden pins driven through little cuts in the edge of the robe into the earth. The flesh side of the robe, being uppermost, is then worked over by two, and sometimes three, squaws. The tools used are often very rude, some being provided simply with sharp stones or buffalo bones. Others, more wealthy, have a something that much resembles a drawing knife or shave of the cooper. The work in hand is to free the hide from every particle of flesh, and to reduce the thickness of the robe nearly one half, and sometimes even more. This fleshing, as it is termed, having been thoroughly accomplished, the hide is thoroughly moistened with water in which buffalo brains have been steeped; for ten days the hide is kept damp with this brain water. Once each day the hide is taken up, and every portion of it rubbed and re-rubbed by the squaws, who do not have recourse to anything like a rubbing board, but use their hands until it would seem as if the skin would soon be torn off. There seems to be no definite rule as to the length of time which the robe shall occupy in curing. The squaw labors until the hide becomes a robe, which may require the work of one week or two, sometimes even more; but I think that ten days may be considered as the average time which it takes to properly cure a robe.

DEER SKINS, To Dress.—Put the skin into the liquid while warm, viz.: eight quarts rain water, to one pint soft soap. Warm it. Then punch the hide, or work it with a soft stick and let it lay one day. It is then to be taken out and wrung—rolled between two logs—or even a wringing machine will be better. Then stretch it until it is dry, in the sun is best, or by a hot fire. Then oil it thoroughly with any oil convenient. It should then be treated to the same bath of suds (heated quite warm), and lay another day. Then pull it out and dry as before. Any oil will do, but good fresh butter is better than anything else. When the skin is dry rub it with ochre, which will give it a splendid yellow color.

DEER SKINS, Oil Dressing.—For curing deerskins etc., take the green hide, as soon as removed from the animal and grain it. This is done by getting a beam seven or eight inches through and six to eight feet long, with two legs in one end and the other resting on the ground so that it will stand at a steep slant. The beam should be of hard wood, should be clean and smooth and with no ridges on it. Take a knife, the corners should be whet smooth so as not to cut the skin. Set down the upper end of the beam against your belly and lay on the skin, hair side down and take off all the unequal substances

before you turn the hair side up. Then commence to grain by beginning with the neck of the skin next to you, shoving it against the hair, holding firmly and using some strength it will soon begin to go and bring a streak of grain. In this way hides are grained when green; when dry they have to be soaked in lime and water until mellow, and then treated the same as a green hide.

DEER SKINS, Tanning and Buffing for GLOVES.—For each skin, take a bucket of water, and put into it 1 quart of lime; let the skin or skins lay in from 3 to 4 days; then rinse in clean water, hair, and grain; then soak them in cold water to get out the glue; now scour or pound in good soap suds; for half an hour; after which take white vitriol, alum, and salt, 1 tablespoon of each to a skin; this will be dissolved in sufficient water to cover the skin and remain in it for 24 hours; wring out as dry as convenient; and spread on with a brush $\frac{1}{2}$ pt. of currier's oil, and hang in the sun about 2 days; after which you will scour out the oil with soap suds, and hang out again until perfectly dry; then pull and work them until they are soft; and if a reasonable time does not make them soft, scour out in suds again as before; until complete. The oil may be saved by pouring or taking it from the top of the suds, if left standing a short time. The buff color is given by spreading yellow ochre evenly over the surface of the skin, when finished, rubbing it in well with a brush.

DOGS, Characteristics of a well bred Pointer.—The head should be broad at the tip, long and tapering, the poll rising to a point; nose open and large; ears tolerably long, slightly erect and falling between the neck and jaw bone, slightly pointed at the top; eyes clear and bright; neck and head set on straight; chest broad and deep; legs and arms strong, muscular and straight; elbows well in; feet small and hard; body not over long, and well ribbed up; loins broad at the top, but thin downwards; hind quarters broad; hind legs strong and large; tail long, fine and tapering; hair short, sleek and close.

DYEING FOR BUCKSKIN (Buff.)—5 parts of whiting to 2 parts of ochre (yellow), and mix them with water to a paste, make into cakes and dry. When a dressed skin is dry rub one of the balls over the surface, rub the powder in. Take a piece of sand paper and raise a nap on the leather by going over with it.—(*Black.*)—Take clear logwood; after it is dry use copperas water to blacken it. Be careful and not use too much copperas.—(*Dark Brown.*)—5 pounds of oak bark; 4 pounds of fustic; 14 ounces of logwood. Use alum water (strong) to make it strike in.—(*Drab.*)—Mix blue clay with soft soap; add blue vitriol to shade the color. It can be made any shade you wish.

DYEING FOR MOROCCO AND SHEEP LEATHER.—The following colors may be imparted to leather, according to the various uses for which it is intended.—(*Blue.*)—Blue is given by steeping the subject a day in urine and indigo, then boiling it with alum; or, it may be given by tempering the indigo, with red wine, and washing the skins therewith.—(*Another.*)—Boil elderberries or dwarf-elder, then smear and wash the skins therewith and wring them out; then boil the elderberries as before in a solution of alum-water, and wet the skins in the same manner once or twice, dry them, and they will be very

blue.—(*Red.*)—Red is given by washing the skin and laying them 2 hours in galls, then wringing them out, dipping them in a liquor made with ligustrum, alum and verdigris; in water, and lastly in a dye made of Brazil-wood boiled with lye.—(*Purple.*)—Purple is given by wetting the skins with a solution of roche alum in warm water, and when dry, again rubbing them with the hand with a decoction of logwood in coldwater.—(*Green.*)—Green is given by smearing the skin with sap-green and alum-water boiled.—(*Dark Green.*)—Dark green is given with steel-filings and sal ammoniac, steeped in urine till soft, then smeared over the skin, which is to be dried in the shade.—(*Yellow.*)—Yellow is given by smearing the skin over with aloes and linseed-oil, dissolved and strained, or by infusing it in weld.—(*Light Orange.*)—Orange color is given by smearing it with fustic berries boiled in alum water, or, for a deep orange, with turmeric.—(*Sky-color.*)—Sky-color is given with indigo steeped in boiling water, and the next morning warmed and smeared over the skin.

FISH CULTURE.—Brook trout that hatch in the winter, lay their first crop of spawn a year from the next fall; each female producing about 300 eggs, and doubling in number yearly until they reach about 6,000. Salmon begin spawning at the same age and time, and produce from 5,000 to 20,000 eggs, according to the age and size of the female. When these fish are spawned and artificially impregnated at the proper time, nearly all the ova hatch, and if kept in the hatching boxes until they commence in the spring, and are then turned into the stream they will take of themselves. In this way the number of fish can be increased a hundred fold annually in each river, beyond the natural increase, till the waters are literally filled with them.—*General Directions,* (as given by Mr. Seth Green). Build your ponds according to the amount of water you have. If you have but little, build small. The water should be changed every 24 or 48 hours, and the oftener it changes the better. The trout can be very plenty if they have sufficient fresh water food. Impregnated spawn can be had from the first of November to the first of March, for ten dollars per thousand, shipped in moss. They can be sent a fifty days' journey packed in a box with moss. I place the moss box in a tin pail, filled with sawdust, so that the spawn will not feel the changes of heat and cold. They cannot be shipped with safety in warm weather.—*Handling the Spawn.*—Pick the moss carefully off from the top of the spawn. Then put the box in a pan of water and turn it nearly bottom side up, and pick the moss out very carefully. The spawn will sink to the bottom, and you can pick the moss out of the pan. If there is a little left in it will do no harm. Then pour the spawn in your hatching trough by holding the edge of your pan under water, and "place" them without touching the spawn, by agitating the water with the bearded end of a feather. The dead spawn will turn a milk white color, and should be picked out. Your trough should be so arranged that the water will run in at about twelve feet per minute. The water should be filtered by running through gravel, or cloth screens, to prevent the sediment from reaching the spawn. I run about one inch of water over my spawn, and if any sediment gets on them and is allowed to remain there long, it will surely kill them.

Remove all sediment with the bearded end of a quill by agitating the water, without touching the spawn.

Large ponds with but little water, get too warm in summer and too cold in winter, for trout to do well. It is detrimental to have any other fish with trout. Any kind of fish or fish spawn is good for feed. The young should be fed twice per day very slowly—if fed fast the feed sinks and belfouls the trough, and the trout will sicken and die. If fed regularly and the trough kept clean with a good change of water, and not kept too thick, they will live and do well. If neglected they will surely die.—*What is death to Spawn.*—The sun, sediment, rats, mice, snails, crawfish and many water insects. My troughs are 25 feet long and 15 inches wide. The water that feeds each trough would go through a half-inch hole with a three inch head. Use fine gravel that has no iron rust in it. My troughs are three inches higher at the head. The average temperature of the water is 45 degs., and the fish hatch in 70 days. Every degree colder or warmer will make about six days' difference in hatching. Trout hatch the soonest in warm water. The sack of their bellies sustains them for forty or forty-five days after hatching; then they need food. I use beef liver, chopped with a razor or sharp knife, nearly to the consistency of blood. If you have small streams or shallow water near the head of your pond, put a few trout in a place in the stream and pond, and they will take care of themselves better than you can. The object of distributing them is that they will get more food. All old streams and ponds have plenty of food for small trout and large, which you will find by examining the moss, sticks and stones in your ponds and streams, as they are full of water insects.

Young trout, one inch long, cost forty dollars per thousand delivered at your nearest express station. They can be carried in cans or barrels any distance when small, and during the months of January, February and March. They cannot be carried with safety in warm weather without a great deal more trouble. It takes as much water to support a one year old trout as it does a thousand small ones, of sufficient size for stocking ponds and for shipping.

My trout begin to spawn the first of November and cease the first of March. *Spawning.*—Fishes, whether in the freedom of nature or in artificial receptacles, show plainly enough the approach of spawning. The belly of the female becomes distended and yields readily to pressure. There is a fluctuation under the hand, which shows that the eggs are free from the ovary and easily displaced. This being the case, take up in your left hand a female fish, and hold it suspended by the head and thorax over a flat-bottomed vessel containing clear water. Then with the right hand passed from above downwards, squeeze the loosened eggs through the anal opening. A male fish is then taken, and the milt is expressed in the same way, though often it flows by the mere act of suspending. This substance, white and cream-like, soon gives to the water the appearance of whey. To insure effectual fecundation, the mixture in this state should be gently stirred with the hand, or with a soft brush. It requires but 2 or 3 minutes to accomplish the fecundation.

FISHING.—Rods for.—At all fishing tackle

shops, rods made of vine, bamboo, hazel, and hickory, of various lengths and fashions, may be procured; some are made to fit into canvas bags, whilst others resemble walking canes; the former, however, are decidedly the best, being longer and better made, as the joints are more carefully fitted together. The rod should, when put together, taper gradually from the butt end to the top, and should be perfectly straight and even. For general purposes, a rod of about twelve feet in length is the most convenient; but in wide rivers, fifteen and eighteen feet rods are required. It is a good plan to have a rod for each kind of fishing, as by such an arrangement they can be kept in complete order, and ready for immediate service. The rods should be ringed to guide the line from the reel; and when screwing the joints together, particular attention should be paid to these rings to see that they run regularly on the under side of the rod, so that there may not be the least likelihood of the line getting twisted. The rods should always be kept in a place of moderate temperature, neither too dry nor too moist; as in the former case they would become brittle, and in the latter, rotten; in warm, dry weather, if the joints are slightly shrunk, they may be moistened a little to make them adhere better; but if, through being too wet, they stick together so that you cannot readily take them to pieces, wait till they dry, rather than strain them by a forcible separation. It is a good plan to varnish the rods once in two or three years with copal varnish, or else with india rubber dissolved over a slow fire in linseed oil; either of these preparations preserves the rods, but especial care must be taken, when re-varnishing, to scrape off the old surface before putting on the new; and the same precaution should be taken if the rods are carried to a fishing tackle warehouse to be repaired.

FISHING, Lines for.—The most serviceable lines are made of pure horsehair, for such as are composed of hair and silk, from retaining the water, soon become rotten; neither can they be thrown with the same precision, as they get soft and flabby, and fall heavily on the water. Good lines should be perfectly twisted, round, and without any irregularities, and in point of color those which are of a light gray, or brown, or white, are the most useful: some anglers, however, prefer a light sorrel tint. The bottom or casting line for fly fishing, which is affixed to the line on the reel, must be of gut, and of about the same length as the rod; the gut should be strong at the top, and very fine at the dropper or bottom, and before any flies are made upon it, it should be picked and tried to see that it is of a uniform thickness throughout.

FISHING, Floats for.—Floats can always be procured ready made, of all sizes and every variety of shape. For small fish and slow streams, quill floats will be found the best, and in strong and rapid rivers, or for the larger kinds of fish, cork floats can be employed. If the angler prefers making cork floats to purchasing them, he must procure a piece of fine grained sound cork, and bore a hole through it with a small red hot iron, then put in a quill which will exactly fit the aperture, and afterward cut the cork into the shape of a pear. When this is finished he must grind it smooth with pumice stone, and paint and varnish it; and if he uses two or three bright colors in the painting he will add much to the

gaiety of its appearance. The cork float should swim perpendicularly in the water, so that it may betray the slightest nibble, and must be carefully poised by fastening a few shot on the line; the sizes of shot proper for this purpose are from swan shot down to No. 4; they should be split about half way through with a small chisel, so as to make a gap sufficiently wide to admit the line, and when the latter is put in the gap should be closed with a pair of pliers.

FISHING, Reels for.—A reel is very useful, as with its assistance parts of a river may be reached which could not otherwise be attempted, it enables the angler also to play his fish with the greatest ease and certainty. When purchasing a reel, a multiplying one should be selected, as it is superior to all others, and enables the angler to lengthen and shorten his line rapidly. It must be kept clean and well oiled, and great care taken that no grit of any kind gets into it.

FISHING, Hooks for.—Hooks are of various patterns and sizes, beginning at No. 1, which is the largest salmon size, and ending at No. 14, called the smallest midge. American hooks are also very good, especially those made by Clarke's patent. Limerick hooks are excellent; and those made in Dublin, marked with 2 F's, 2 B's, and so on, are second to none. A bad hook, be it remembered, is worse than a bad knife, only fit to be thrown away.

When fastening the hooks on your lines, use strong but fine silk, and if you can get it near the color of your bait, so much the better; wax the silk thoroughly with shoemaker's wax, and wrap it four or five times round the body of the hook, then place the gut or hair on the inside of your hook, and continue winding the silk tightly round till you have wrapped it about three parts down the hook.

Whipping is finished off by slipping the end of the silk through the last circle, and drawing it tight. Knotting, by laying two pieces of gut or hair together, one overlapping the other some three inches or so, then holding one end in the left hand, while forming a simple slip knot on it; then turning the other end to the right, and doing the same; after that drawing the two together, when the knot is complete. No direct pull will ever loosen this water knot, though it can be undone easily. Gut is obtained from the silk-worm. Gimp is any kind of tackle covered with fine brass wire, to protect it from the teeth of fish, sharp stones, or other injury.

FISHING, Baits for.—Fish, in their natural element, take such baits as the changing seasons produce, and will not at one time of the year bite at the same bait which they may be caught with at another; for instance, in the spring and autumn, worms may be used all day long, but in summer, worms must only be used early and late, morning and evening. An earth-worm is naturally the first bait the young angler looks out for: it is always to be had, is put on the hook without difficulty, and (excepting at the times above stated) may always be used for certain kinds of fish, with the certainty of hooking something, if proper patience is used. When baiting with a worm, the hook should be put in close to the top of the worm's head, and then passed carefully down, gently working the worm up the hook at the same time. Not more than a quarter of an inch of the worm should be left hanging

over the hook. To scour or starve these worms, and get rid of the earthy matter they contain, they must be placed in damp moss, not soddened with water, but only damp. In creeping through the fibers of the moss, they compress and empty themselves.

The ash-grub, which is found in the rotten bark of a tree that has been felled some time, is an excellent bait for all small "pan" fish, such as chub, sun-fish, perch, etc., and may be used all the year round; it should be kept in wheat bran. All grubs or worms make good bait for little fresh water fish.

Grasshoppers are good baits during June, July, and August; their legs and wings must be taken off before they are put on the hook.

Shrimp are good for bass, tom cod, and lafayette fish. Crab and clam are good bait for these also, shedder crab especially.

FISHING, Paste Baits for.—(*Cheese Pastes.*) Take some old cheese and the crumb of white bread, and mix them up to a tolerable degree of consistency, and you will make a good bait for chub. (*White Bread Paste.*) Knead crumbs of white bread dipped in honey in the palm of your hand until they attain a fair degree of consistency; it is good for small fish. (*Wheat Paste.*) Procure some new wheat, remove the husks, and afterward pound it; then pour some milk or water over, and gently simmer the composition; when cold, it will be somewhat like a jelly, and a very small piece only should be put on the hook.

Paste baits are not at all adapted for swift, running streams, but for quiet brooks, ponds, or very still rivers; you must be sharp of eye, and quick to strike, otherwise both fish and bait will give you the slip. A quill float is better than a cork one when baiting with paste, as it betrays the slightest nibble.

FISHING, Ground Bait for.—Ground baiting is a most essential part of angling, and ought never to be omitted, as success in bottom or float fishing cannot be expected, unless the proper means for drawing the fish together are resorted to. The object for throwing bait into the water, is to collect fish to one particular spot, and then to use a superior kind of bait, though of a similar kind, on the hook. Thus, if going to angle with earth worms, throw in for ground bait those that are unscoured, and fish with those that are well scoured.

For small creek fish, mix bran and clay together into lumps about the size of an apple; place some grubs in the middle, and close the clay over them. It is a very useful bait in a still pond, hole, or slight eddy.

Or take the crumb of white bread, soak it in water, squeeze it almost dry, add bran, and work them up together until they acquire the consistency of clay.

Brewer's grains will also be found very serviceable; they must be perfectly fresh.

Grubs, worms, the toughest parts of crabs, lobsters, or clams, may be thrown in without taking the trouble of working them into balls or clay, if the water is perfectly still; but if you are fishing in a stream, such a system of ground baiting is injurious, as they are carried away by the stream, and draw the fish from the spot.

FISH, Chinese Art of Catching.—Take *Cocculus Indicus*, pulverize and mix with dough, then scatter it broadcast over the water as you

would sow seed. The fish will seize it with great avidity, and will instantly become so intoxicated that they will turn belly up on top of the water, by dozens, hundreds or thousands, as the case may be. All that you now have to do, is to have a boat or other convenience to gather them up, and as you gather, put them into a tub of clean water, and presently they will be as lively and healthy as ever.

FISH, Charms.—The so called fish charms, as given in many books and retailed as great secrets, are as a rule a mass of nonsense, and when employed successfully make the fish, caught, undesirable for eating, impregnated more or less as they must be, with the "charms". These remarks apply also to the above "Chinese art of catching". The only legitimate way of catching fish is by the hook and net and no other should be resorted to. Some of these "secrets" are as follows: For bait, take a handful of swamp-apple blossoms; put them in a glass jar or bottle, together with a gill of rum; cork the bottle tight and let it stand in the sun for three or four hours; then take half a pint of water that is found in places where grows the plant commonly termed flytrap. This plant, the botanical name of which is *dionaea muscipula*, vegetates in quag moss around fresh ponds. Saturate your bait with the liquid two or three hours before using. The liquid should be kept in a wooden or earthen vessel. Another is to put the oil of Rhodium on the bait when fishing with a hook, and you will always succeed; or, take the juice of smallage or lovage, and mix with any kind of bait. As long as there remain any kind of fish within many yards of your hook, you will find yourself busy pulling them out. Or, get over the water after dark, with a light and a dead fish that has been smeared with the juice of stinking gladwin. The fish will gather around you in large quantities, and can easily be scooped up.

FISHING, without Nets, Lines, Spears, Snarers, "Bobs", or Bait.—The following plan we have known used with great success to catch fish in winter, in Pennsylvania. Where the water was clear and still, say the back water of a dam, it would often freeze hard enough to make good skating and yet the ice would be so clear that the fish could be seen lying at the bottom or lazily moving about. By striking the ice (not too hard) immediately over the fish, a sufficient concussion would be produced to stun the fish. It would immediately turn over and come up to the ice, its white belly showing clearly against the ice below, when we proceeded to cut a hole and take out the fish. A mallet generally was used to strike the ice, as we produced a stunning blow with it without killing the fish, as would be likely to occur were the blow struck with the poll of the ax. On taking the fish home and putting them into water—although some or all would be frozen stiff, quite a number would often revive, and it was to produce this result that the mallet was preferred to strike with.

FISHING, With Natural Fly.—This consists in fishing with the living flies, grasshoppers, etc., which are found on the banks of the rivers or lakes where you are fishing; it is practiced with a long rod, running tackle, and fine line. When learning this system of angling, begin by fishing close under the banks, gradually increasing your distance until you can throw your live bait across the stream, screening yourself behind

a tree, a bush, or a cluster of weeds, otherwise you will not have the satisfaction of lifting a single fish out of the water. In rivers where immense quantities of weeds grow in the summer, so as almost to check the current, you must fish where the stream runs most rapidly, taking care that in throwing your line into those parts you do not entangle it among the weeds. Draw out only as much line as will let the fly touch the surface, and if the wind is at your back, it will be of no material service to you in carrying the fly lightly over the water. In such places the water is generally still, and your bait must if possible be dropped with no more noise than the living fly would make if it fell into the water. Keep the top of your rod a little elevated, and frequently raise and depress it and move it to and fro very gently in order that the fly by its shifting about may deceive the fish and tempt them to make a bite. The instant your bait is taken, strike smartly, and if the fish is not so large as to overstrain and snap your tackle, haul it out immediately, as you may scare away many while trying to secure one. There are very many baits which may be used with success in natural fly fishing, of which, however, we shall content ourselves with enumerating some of the most usual and useful.

Wasps, hornets and humble bees are esteemed good baits for dace, eels, roach, bream and chub; they should be dried in an oven over the fire, and if not overdone, they will keep a long while.

FISHING, With Artificial Fly.—Artificial fly fishing consists in the use of imitations of these flies and of other fancy flies, and is unquestionably the most scientific mode of angling, requiring great tact and practice to make the flies with neatness and to use them successfully, and calling forth as it does so much more skill than the ordinary method of bottom fishing, it merits its superior reputation. It possesses many advantages over bottom fishing, but at the same time it has its disadvantages; it is much more cleanly in its preparations, inasmuch as it does not require the angler to grub for clay and work up a quantity of ground baits, and is not so toilsome in its practice, for the only encumbrances which the fly fisher has are simply a light rod, a book of flies, and whatever fish he may chance to catch; but there are several kinds of fish which will not rise at a fly, and even those that do will not be lured from their quiet retreat during very wet or cold weather. It would be as well if the young angler could go out for some little time with an old experienced hand, to observe and imitate his movements as closely as possible; but as many of our readers will not, in all probability, be able to enjoy such an advantage, we subjoin some instructions by which they may pursue this interesting branch of angling.

FISH, Skinning and Mounting.—This class of animals possess many beauties, which when removed from their native element, vanish forever, and it is in vain for the taxidermist to try to imitate those iridescent tints which characterize the living specimens. The best he can do is to preserve in form and general outline those characteristics by which he may be able to recognize his subject. Before proceeding to describe the operation of skinning, it may be well to state that the scales, as well as their color, may be preserved to a certain degree by applying tissue-paper to them, which from the natural glutinous

matter which covers the scales will adhere firmly; this being allowed to remain until the skin has dried, may be easily removed by moistening with a damp cloth. All small fish should be mounted in section, while the larger varieties may be preserved entire. Suppose the fish to be of such a size as to be mounted in section. First, it is necessary that it be as fresh as possible, as the scales will become detached if decay be allowed to commence. Lay the fish on one side, and cover the side uppermost with tissue-paper, as stated above; also extend the fins by means of the same, and allow them to remain a few moments until they become fixed and dry; this will be a protection to the fins and scales during the process of skinning. Having provided yourself with a damp cloth, spread it smoothly upon the table, and place the fish upon it with the paped side down. With the dissecting-scissors cut the skin along a line following the contour of the body, but a little below the extreme dorsal edge, and a little above the ventral one, and remove the skin included within this line. The remaining skin must now be detached from the flesh, beginning at the head and separating it downward toward the tail. The spine must be severed close to the head, and also at the tail, and the entire body removed. All the flesh having been taken from the skin, and the eyes removed, the inside must be wiped out and the preservative applied. It is necessary here to repeat the caution not to use any unnecessary strain that will be liable to distend the skin. The skin should now be filled with cotton or tow, and this must be laid so evenly that there shall be no prominences upon the outside of the same. When filled, it should be laid with the open side down, upon a board of proper dimensions previously prepared, and fastened to it by means of small tacks, commencing at the head, and fastening the edges downward toward the tail. It should then be set aside in the air to dry, care being taken not to expose it to the rays of the sun. When dry the paper which covers the exposed side, and with which the rays are distended, may be removed in the manner previously stated, and the glass eyes inserted with a little putty. As the glass eyes used by taxidermists are generally too spherical, and polished, it is well to manufacture them of wood, using common paint to restore the color, avoiding the use of varnish. Finally, the skin should receive a coat of thin colorless varnish, after which it is ready for the cabinet. In sharks and large fishes an incision should be made below the head at its base, along the ridge of the back, following to either side of the dorsal fin down to the tail. The skin can then be separated on each side, and by severing the vertebrae at the head and tail, the entire body may be removed. The tail having been skinned, the head should be pushed inward and the skin passed over it, when all the cartilage can be freely cut away. In stuffing these large species it becomes necessary to use a body support, and a bar of light wood may be used for this purpose; this should enter the skull, thereby being more easily kept in position, and extend to the base of the tail. Hooks can be fastened to this bar, and by means of wire the specimen can be suspended from above. The body should then be stuffed with hay, and the incision upon the back carefully sewed up. If the first coat of varnish is observed to rise in scales, it should be removed with a so-

lution of nitric acid and water, and the skin allowed to dry, when a second application of varnish will ever afterward remain quite solid.

FOXES, To Trap.—The trap should be well smeared with blood, or beeswax, to destroy the odor of the iron. Set it in soft earth, packing moss or leaves lightly around the pan and jaws. Bait with fried meat. An old trapper says: "to make the allurements doubly sure, obtain from the female of the dog, fox or wolf, the matrix, in the season of coition, and preserve it in alcohol, tightly corked. Leave a small portion of it on something near the trap; also, when visiting the traps, put some on your boots."

Another method is to make a bed of chaff in the open field, in a locality the fox is supposed to visit, but where it will be least likely to be visited by passing hunters. Visit it daily, and stir into the chaff, very old or toasted cheese, or scraps of meat made fine, using the utmost caution not to change the appearance of the bed or its surroundings, and making as few tracks as possible. The materials of which the bed is composed should not be handled any more than is absolutely necessary. Too much care cannot be taken in making the bed; for if foxes are plenty, and you get several to visit it, it will last for some time, and will afford you a great deal of amusement. As soon as you are satisfied a fox has visited the bed regularly for five or six nights, you may put in your trap. It should be a small sized double spring, and should be fastened to a clog, light enough for the fox to drag, but heavy enough so that he cannot get too far away; though if there is snow on the ground, there will be no difficulty in finding him, if he goes some distance. He may be caught the first night, but more likely than not, will dig out your trap, or show his contempt in some other way, compelling you to bring into force all your ingenuity, before your efforts are successful.

FURS, How to Select.—In purchasing furs a sure test of what dealers call a "prime" fur is the length and density of the down next the skin; this can be readily determined by blowing a brisk current of air from the mouth against the set of fur. If the fibers open readily, exposing the skin to the view, reject the article; but if the down is so dense that the breath cannot penetrate it, or at most shows but a small portion of the skin, the article may be accepted.

FURS, To Clean.—Strip the fur articles of their stuffing and binding, and lay them as much as possible in a flat position. They must then be subjected to a very brisk brushing, with a stiff clothes-brush; after this, any moth-eaten parts must be cut out, and be neatly replaced by new bits of fur to match. Sable, chinchilla, squirrel, fitch, etc., should be treated as follows: warm a quantity of new bran in a pan, taking care that it does not burn, to prevent which it must be actively stirred. When well warmed, rub it thoroughly into the fur with the hand. Repeat this two or three times; then shake the fur, and give it another sharp brushing until free from dust. White furs, ermine, etc., may be cleaned as follows: lay the fur on the table, and rub it well with bran made moist with warm water; rub until quite dry, and afterward with dry bran. The wet bran should be put on with flannel, and the dry with a piece of book-muslin. The light furs, in addition to the above, should be well rubbed with magnesia, or a piece of book-muslin, after the

bran process. Furs are usually much improved by stretching, which may be managed as follows: to a pint of soft water add three ounces of salt; dissolve; with this solution sponge the inside of the skin (taking care not to wet the fur), until it becomes thoroughly saturated; then lay it carefully on a board with the fur side downward, in its natural disposition; then stretch, as much as it will bear to the required shape, and fasten with small tacks. The drying may be quickened by placing the skin a little distance from the fire or stove.

FURS, To preserve from Moth.—Darkness is all that is necessary. The "miller," the eggs from which moths are hatched, only moves in light; the moths themselves work in darkness. Hang the furs in a very dark closet and keep the doors shut; keep it always dark, and you can have no trouble. But, as closet doors are sometimes left open, the better way is to enclose the articles loosely in a paper, put this in a pillow-case, or wrap around a cloth, and hang it up in a dark closet. Camphors, spices or perfumes are of no use. Continual darkness is sufficient. And do not take out the furs in June or July to give them an "airing," for even then cometh the enemy, and it may be that, in fifteen minutes after exposure, it has deposited a hundred eggs. If you consider an airing indispensable, give the furs a good switching, and put them quickly back.

FURS, Domestic Manufacture of.—The skins of racoons, minks, muskrats, rabbits, foxes, deer, cats, dogs, woodchucks and skunks are all valuable. Handsome robes may be made from the skins of the last two animals and the writer has seen fur coats made from the skins of woodchucks, well tanned, dyed and trimmed, which were elegant as well as comfortable, and no one but a connoisseur would be able to guess their origin. Of the finer and nicer furs, beautiful collars, muffs, cuffs, caps, gloves and trimmings may be made, with a little ingenuity and perseverance; and who would not feel a greater satisfaction in wearing nice article, from the fact that it was something of their own manufacture, a product of their own taste and genius?

Very handsome floor mats are made by tanning sheep pelts, and dyeing them some bright color, which is done with very little trouble; the art of dyeing is now so familiar to almost every household. Furs may be dyed as easily as woolen goods, notwithstanding the impression that it is an art known only to the trade. Any dye that will color woolens will also dye furs, only care must be taken not to have the dye too hot or the texture of the skin will be injured.

The mode of tanning usually followed by city farriers, is to rub the skins well with rancid butter, then tread them thoroughly in a tub or vat, after which a large quantity of sawdust is mixed with them, and the process of treading continued until all the grease is absorbed, when they are finished off by beating, working and rubbing with chalk and potter's clay, whipping and brushing. An old trapper practised this method with small skins, first washing with a suds of soap and soda to free them from grease, then rinsing in clear water to cleanse them from the suds, then rubbing as dry as possible, after which they were put into a mixture of two ounces of salt to a quart of water, added to three quarts of milk or bran water containing one ounce of best sulphuric acid, and stirred briskly for forty or fifty minutes;

from this they are taken dripping into a strong solution of sal-soda and stirred till they will no longer foam; they are then hung to dry, when they are very soft and pliable. A very good and simple process in use among farmers is to sprinkle the flesh side, after scraping it well, with equal parts of pulverized alum and salt, or washing it well with a strong solution of the same, then folding the flesh side together, and rolling it compactly; in which state it should remain for eight or ten days; then it is opened, sprinkled with bran or sawdust to absorb the moisture, and rolled up again, and after remaining 24 hours, the process is completed by a thorough rubbing and manipulation, on which the pliability depends. Skins, when taken off, should be freed from grease or flesh, by thorough scraping, when they may be dried, and left to await the leisure of the owner. Previous to tanning they must be well soaked and wrung dry.

It is no extravagance to assert that every farmer's family may furnish their own fur collars, gloves, robes, and other articles of dress and ornament, with trifling expense from the resources within their own reach; but from want of more knowledge on the subject, valuable skins are wasted or disposed of for a mere fraction of their real value, and articles of apparel that should have been made from them are bought at extravagant prices of fur dealers.

GOPHERS, To Trap.—Go where they work; find the last mound made; open the hole, set in a common spring trap, cover with a little light sand; leave the hole open. The gopher will come to close the hole, and get trapped.

GOPHER TRAP, How to Make.—Take a hard piece of wood, about nine inches long, and turn it so that one end will be two and a half inches in diameter and the other end three inches gradually sloping from one end to the other. With a two inch auger bore a hole in the small end eight inches deep. Then take a fine toothed rip saw and split it open from end to end in two equal parts. In one of these halves a spring door is fixed, made of sheet iron, which is round like the opening and curved to fit down in the half. This is made fast on a hinge near the entrance, with a spring under it sufficient to raise it to a perpendicular, the hinge so arranged that it can only be raised to a perpendicular. Another piece of sheet iron, made round to move easily in the two-inch opening, is made which is attached to a long, narrow strip of iron, which strip moves easily under two staples in the bottom of the half to which the door is fastened.

In order to set the trap the door is pressed down, and the end of this strip projects over it and thus holds the door open. Then take the two halves and put them together, and slip over them a thin wide ring, made sloping like the trap, and it is ready for use.

With this trap you go out where the gopher is at work, and find his last made hillock, and if it is not quite finished, all you have to do is to stick the trap in the hole, open end downward, and in a short time he will bring up his load of dirt, and, in pressing against the upper piece of iron, he will push the strip of iron from over the door, when the spring will lift it up and shut him in.

GUNS, To Guard against Bursting.—It is stated that ninety-five out of every hundred instances of the bursting of a double-barrel gun can be traced to defects in the left barrel. The

reason is simply that the right is more frequently used and reloaded, perhaps ten times to the left one being discharged once. Every time the right barrel is discharged the gunpowder in the left is pulverized more or less by the shock, and the settling of the grains leaves a space between the charge and the wadding. Hence when the left barrel is discharged it frequently explodes. These accidents, it is asserted, can be avoided by sending the ramrod home with one or two smart blows into the non-discharged barrel every time the other is reloaded.

GUNS, How to Choose.—Whatever may be the particular make you prefer, let your gun be a good one. If you are not competent to select yourself it would be best to obtain the aid of some capable and reliable friend, and we recommend you to purchase of some dealer of established reputation. The claims of the different makers can, in most cases, be ascertained from their respective circulars. Breech-loaders have several important advantages, though many sportsmen retain a preference for the old-fashioned muzzle-loading gun, for its supposed superior shooting powers. In every other respect the first rank seems conceded to the breech-loader; with it the sportsman's hand need never be at the muzzle under any circumstance. It is far more expeditiously used, as powder, shot, cap and wadding are all inserted in the barrel at the same time; and it is far more easily cleaned, as all that is required is to draw a piece of flannel attached to a string through the barrels once or twice after a days shooting.

GUNS, How to Use Effectively.—The secret of success is a very simple matter after all. It consists in aiming well forward; nine out of ten misses are owing to the aim not being sufficiently forward. When game is going from you near the ground, the aim should be full high, or the bulk of the charge, if not the whole of it, will pass below it; and when birds are higher than the gun going from you, the aim should be equally low, or the charge will pass above them. In cross-shots within, say thirty-five or forty yards, the aim should be at least a foot or a foot and a half in front of it; at greater distance the allowance should of course be more. In partridge shooting, always endeavor to get cross-shots if possible, and this may generally be done by walking across, or heading your dog when pointing. If you go straight from him to the birds, they will generally go straight away; birds when flying across you present a far easier shot, and expose a more vital part.

GUN, (Scattering Shot) How to Remedy.—The only remedy known to gun-smiths is by choke-boring, that is, boring from the breech of the gun, and so as to have a gradual taper toward the muzzle. This method of boring greatly improves the shooting qualities of the gun, as the charge concentrates at the muzzle. Large shot are more apt to scatter than fine, but this depends on the bore of the gun. A large-bored gun does not shoot fine shot so well as medium. A small-bored gun throws fine shot with greater force than a large-bored one. As a general thing, a small-bored gun is not adapted to large shot, as it does not chamber them well. The length of gun also depends on the size of bore—28 or 30 inches for a gun of from 10 to 14 gage; 30 to 34, of guns from 8 to 10; 26 to 28, guns of 15 to 18 gage.

GUN, (Shot) How to Clean.—First place your hammers at half-cock, draw out the ramrod and bolt; then lift the barrels from the stock and you are ready to wash. Place the barrels in cold water, being careful the water is clean and that there is not any dirt or sand in the pail; then if you have the three-jointed washing rod with the necessary implements that accompany it, first use the brush until you have removed most of the dirty powder; next take tow, and wash until you have gotten it perfectly clean; then take soft cotton rags, and dry it out thoroughly. It is best to rub the barrels until they feel warm to the hand, then you may know your gun is dry, and in no danger of rusting. Hot or boiling water should never be used in the cleaning of a shot gun because it will, — can not help—injuring the "temper" of it.

HAWK and Owl Traps.—To catch hawks or owls, take a pole 20 feet long, to be set a short distance from the house or barn or on the poultry house. Split the top so as to admit the base of a common steel trap, which should be made fast. When both trap and pole are set you may be sure of game of some kind. These birds naturally light on high objects such as dead branches of trees or tops of stacks, and one should use judgment about the place where he puts the traps. An open field, near the chicken yard, is probably best.

HIDES, New Mode of taking off.—A new machine for taking off hides is now in use in South America. The operation is short, sharp, and decisive, requiring only a minute for each hide. Cold air is forced by a pump between the flesh and the hide, and the thing is done. The process ought to be an improvement on the old hacking and scraping system.

HIDES, (Green) To Cure.—A great many butchers do not use proper care in this branch, and the consequence is that the hides will not pass city inspection, owing entirely to the ignorance and carelessness of persons preparing them for market. The proper way to salt hides is to lay them flat, flesh side up, and form a nearly square bed say 12 by 15 feet, folding in the edges so as to make them as nearly solid as possible. Split the ear in the cords that run up the ear in each one, so as to make them lie out flat. Sprinkle the hide with two or three shovelfuls of coarse salt, as the size may require—say for a sixty or eighty pound hide, from ten to fifteen pounds of salt. At any rate cover the hide well, as it need not be wasted; then let them lie in this from 12 to 20 days, after which take them up, shake the salt out and use it again.

INSECTS, To Preserve.—After killing the insect with chloroform, paint it with a solution of carbolic acid in alcohol—4 grains to the ounce—and then dry in the sun. This will keep it fresh and beautiful.

LAMBSKINS, To Prepare for Ladies Overcoats.—Make a strong suds with hot water; let them get cold, and wash the skins, squeezing them carefully to get out all the dirt from the wool; wash the soap out with clean cold water, and cover them with water for 12 hours; then hang them over a pole to drain; when partially dry, stretch them carefully on a board, and when a little damp, sprinkle on them an ounce each of pulverized saltpeter and alum; lay the flesh sides together, and hang in the shade for two or three days, turning them over every day to bring

the under skin, uppermost till they are perfectly dry; then scrape the flesh side till all scraps of flesh are removed; rub it with pumice or rotten stone and with the hands; then lay the cloak-pattern down on the flesh side of the skin, trace it round with a pencil, and cut it out with a sharp knife; overcast the edges together on the wrong side, and line with quilted silk. No collar, fur, or trimming is worn with an astrachan or lambskin cloak.

LEATHER, To Gild or Silver.—Finely-powdered resin, and dust it over the surface of the leather, then lay on the leaf, and apply (hot) the letters or impression you wish to transfer; lastly, dust off the loose metal with a cloth. The cloths used for this purpose become, in time, very valuable, and are often sold to the refiners at a high price.

LEATHER, Oiling.—Oils should not be applied to dry leather, as they will invariably injure it. If you wish to oil a harness, wet it over night, cover it with a blanket, and in the morning it will be dry and supple; then apply neat's-foot oil in small quantities, and with so much elbow grease as will insure its disseminating itself throughout the leather. A soft, pliant harness is easy to handle, and lasts longer than a neglected one. Never use vegetable oils on leather and among animal oils neat's foot is the best.

LEATHER, French Patent.—Work into the skin with appropriate tools 3 or 4 successive coatings of drying varnish, made by boiling linseed-oil with white lead and litharge, in the proportion of one pound of each of the latter to one gallon of the former, and adding a portion of chalk or ochre, each coating being thoroughly dried before the application of the rest. Ivory black is then substituted for the chalk or ochre, the varnish thinned with spirits of turpentine, and five additional applications made in the same manner as before, except that it is put on thin and not worked in. The leather is rubbed down with pumice-stone, in powder, and then placed in a room at 90 degrees, out of the way of dust. The last varnish is prepared by boiling $\frac{1}{2}$ lb. of asphaltum with 10 lbs. of the drying oil used in the first stage of the process, and then stirring in 5 lbs. copal varnish and 10 lbs. of turpentine. It must have 1 month's age before using it.

LEATHER, French Polish or Dressing for.—Mix 2 pts. best vinegar with 1 pt. soft water; stir into it $\frac{1}{4}$ lb. glue, broken up, $\frac{1}{2}$ lb. logwood-chips, $\frac{1}{4}$ oz. of finely powdered indigo, $\frac{1}{4}$ oz. of the best soft-soap, $\frac{1}{4}$ oz. of isinglass; put the mixture over the fire, and let it boil ten minutes or more; then strain, bottle, and cork. When cold, it is fit for use. Apply with a sponge.

LEATHER, (Enameled) To polish.—2 pints of the best cream; 1 pint of linseed oil; make them each lukewarm, and then mix them well together. Having previously cleaned the shoe from dirt, rub it over with a sponge dipped in the mixture; then rub it with a soft dry cloth until a brilliant color is produced.

LEATHER, To Tan.—Soak the hide eight or nine days in water, then put it in lime; take it out, and remove the hair by rubbing it, and soak it in clear water until the lime is entirely out. Put one pound of alum to three of salt, dissolve in a vessel sufficiently large to hold the hide; soak the hide in it three or four days, then take it out, let it get half dry, and then beat or

rub it until it becomes pliable. Leather prepared by this process will not do so well for shoes, but answer well for ham strings, back bands, and various other purposes on the farm. See "Tanning" further on.

LEATHER SCRAPS, To Utilize.—Here is a method lately proposed by a Danish inventor, one Mr. Thamsen, of Copenhagen. He takes leather waste, cuttings, shaving or other small bits of leather, either new or old, and reduces it to a kind of fibrous pulp by hand-labor or by a machine or mill, (either by grinding, pounding, cutting, rasping, carding, or grating); if old waste is used, it should first be cleaned thoroughly. This matter or pulp is then kneaded with India-rubber, which is rendered fluid or dissolved in oils or spirits, and treated with ammonia. Then he dissolves the India-rubber in oil of turpentine. To effect this, the India-rubber is cut into pieces and mixed with turpentine, after which he lets it remain quiet in a closed vessel until it is dissolved. When the India-rubber is dissolved, he adds ammonia of a strength of 30 per cent. in the proportion of about equal parts by weight of ammonia to the India-rubber contained in the solution; when the mass has become of a grayish-white color, it is ready to be mixed with the pulp.

Another and better mode is as follows. The scraps are first cleansed, then soaked in water containing 1 per cent. of sulphuric acid until the material becomes soft and plastic, and afterward compressed into blocks and dried by steam. In order to soften the blocks one pound of glycerine is added to 100 pounds of material; they are then passed through rollers, and brought to the proper thickness to be used as inner soles of boots and shoes.

MINK BREEDING, To Trap Young Mink.

—Adult minks are almost untamable, but young ones readily submit to handling, and are easily domesticated. The time to secure young minks is in May and June, when they begin to run with their dams. The streams must be quietly watched for mink trails, and these tracked to the nest. When they leave the hole the old one may be shot, and the young ones secured, or, they may be dug out. Those who own a breeding stock of minks ask high prices for them; but trappers represent to us that it is an easy matter, with a little patience, to get the wild young ones.

Habits.—A successful breeder says that he does not attempt to tame the wild mink, but only aims to supply for it in a small space all the necessities of its natural instincts. He says the mating season commences about the first of March, and lasts two weeks, never varying much from that date. The female carries her young about six weeks. In the minkery, where diet, water, temperature, etc., are similar with each animal, there is so little difference in the time of mating and time of bearing young in different animals, that five out of six litters' dropped last spring, were born within twelve hours of each other. The young are blind from four to five weeks, but are very active, and playful as kittens. The mother weans them at from eight to ten weeks old. At four weeks the mother begins to feed them meat; this they learn to suck before they have teeth to eat it. The nests in which the young are born are lined by the mother with soft material, and are made in the hollow of some old stump, or between the projecting roots of some old tree,

and always where it is perfectly dry. The nest is located near pure running water, which the mother visits twice every twenty-four hours. She feeds her young on frogs, fish, birds, mice, crabs, etc., etc. The mink is from birth a pattern of neatness and cleanliness, and as soon as a nest begins to get foul and offensive, she takes one of the young in her mouth, and depositing it in a clean, suitable place, builds a nest about it, and then brings the balance of the litter. She feeds and cares for them until they are three and a-half or four months old. When the young are weaned, about the 10th of July, she builds her nest near the water, in which the young soon learn to play. There are usually four in a litter, though the number ranges from two to six. Towards fall the mother separates them into pairs. One pair—or if the number be odd, the odd one—is left in the nest; the other pair, or pairs, she places often half a mile from each other, and then seeks new quarters for herself. The young soon separate, and each one catches his own frogs. They do not pair, but the male is a sort of rover and freeloader. Minks, are unsociable, petulant, vicious in play, savage in war. Late in the fall they establish regular runways from one stream to another, and usually under brush, fallen trees, weeds, swale and under banks—anywhere, in fact, where they can avoid the sunshine and escape the chances of observation. The mink is a sure prophet, and just before hard winter begins, he lays by a store of food for the winter in safe places, near his winter nests, of which he has several. As the snows fall he burrows under the snow, where he remains until about February, when his supply of food is exhausted and he is forced to search further for food.

Management of.—Mink being by nature solitary wandering creatures, being seldom seen in company except during the breeding season, are therefore impossible to be reared successfully, if large numbers are kept constantly together therefore their inclosure should be a large one.—The male and female should be permitted to be together frequently from the middle of February until the middle of March. At all other times keep them entirely separate. The young mink make their appearance about the first of May. When wild in the woods they will seldom vary five days from this time; but when kept in confinement there is greater variation. About this season they should have plenty of fine hay, which they will carry into their boxes to make nests. A box three or four feet long and 18 inches wide is the shape they prefer; it should be placed as far as possible from the water, to prevent the mink from carrying water and mud into it. The young mink when first born are small and delicate, destitute of any kind of fur, and much resembling young rats. If the old mink is tame, the young ones may be taken out of the nest and handled when they are three weeks old. They will soon learn to drink milk, and may be fed every day. At five weeks old they may be taken from the mother and put into a pen by themselves, when they will soon become very playful and pretty, and make much better mothers than they would if allowed to run with the old ones. The shelter should be in the shape of a long box, 5 or 6 feet wide, and 3 or 4 feet high, set upon legs, and with a good floor and roof. Divide it into separate apartments, 6 feet long (or longer would be better), the front

of each apartment to be furnished with a swinging-door of strong wire screen, with the hinges at the top, and a button or some kind of fastener at the bottom. A trough, 6 inches square, made by nailing three boards together, should run the whole length of the pen on the back side; one end of the trough should be made several inches lower than the other, so that the water can be drawn off. With this arrangement the water can be turned in at one end of the trough, and be drawn off and changed as often as desired. The lower end of the trough should be a little deeper than the other, to prevent the water from running over. Each apartment is furnished with a box 3 feet long and 18 inches wide. On one side of the box and near one end is made a round hole, $2\frac{1}{2}$ inches in diameter, and provided with a sliding cover, so that by means of a stick it can be opened or closed from the outside. This is so the mink can be shut up when the pen is being cleaned out. On the top of the box and at the other end should be a door large enough to put in hay for the nest and take out the young. It is necessary that they have abundance of pure, soft water, fresh air, desirable shade and plenty of exercises. These conditions secure to the mink a good quality of dark fur, and good health. Brush, weeds, etc., are allowed to grow in the yard, but not near enough the wall to admit of their climbing up and out.

MINK BREEDING. In addition to the above direction for breeding mink, we give the following experience of a gentleman in Vermont: "I purchased one female and her litter of five, two males and four females in all, and constructed a building of rough boards, 10 by 4 feet, for a minkery. It had a floor tight enough to prevent the escape of the animals; was properly ventilated, and divided into 6 apartments, one of which is an ante-room into which to step from the outside and close the door. Water is supplied by a lead pipe running in at one side, through all the rooms, and out at the other into a trough where small fish are kept, and occasionally given to the minks. They were kept together until December the 18th, when the males were put in an apartment by themselves. On the 10th of March each male was put in with a female, each pair separate, and after a couple of days one of the males was put in with another female, and finally with the third. They were separated about the 1st of April, each female being kept alone and supplied with a suitable box, with warm material for a nest. When it was supposed they were about to bring forth their young, they were disturbed as little as possible; anything to excite them at this time, should be avoided, for when irritated, they will sometimes eat their young. The first female put with the perfect male brought forth seven, one of which disappeared after they began to crawl around out of their nest. The other two females had each a pair, all of which (but the one mentioned) are now alive, fine, fat, sleek fellows, and fully grown. They are very easily kept, being fed once a day upon warm milk with wheat bread crumbs, a quart sufficing now for the whole lot, and once upon fresh meat, care being taken not to overfeed. Any kind of meat and offal that is not too fat will answer. They are very fond of beef liver, chickens' heads and entrails, woodchucks, (being careful not to give them the gall on the liver, which is poisonous,) rats, mice, etc. They

are more easily cared for than one hog, and much more cheaply kept. Nothing was paid out for meat for them, until after 1st of July, when a contract was made with a butcher to leave a bullock's head once a week. I am confident that the increase of the minkery would have been fully one-third more if both the males had been perfect. I intend to keep them in pairs hereafter. They are not easily handled, but struggle when caught against their will, and exude the thick fetid substance from glands near the vent. They will bite severely, but can be handled safely with thick buckskin gloves.

MINK, To Trap.—For mink the trap should be set near some stream. If their holes cannot be found make one. Set the trap in the cavity, three sides of which should be barricaded with stones, bark or any equivalent substance. Place the bait at the farther extremity of the cavity, beyond the trap. Bait with any kind of fresh meat; muskrat meat is good, but fish, either fresh or stale is better. Bait should be smoked in cold weather, to give it a stronger smell. The best scent for attracting mink is prepared from the decomposition of minnows, eels or trout. Cut the fish into small pieces; put into a bottle, cork loosely, and let it hang in the sunshine two or three weeks in the summer. A few drops of this on the bait, or on a stick near the trap, will draw mink a long distance.

MOLES (Ground), To Destroy.—There are several mole traps in market that work well, provided the moles can be induced to go where they will be caught. In addition to the traps, set men to watching the moles during light showers in summer, at which time they are more active, and when one is found moving the soil he is to be dug out and killed. More moles have been caught in this way than with all the traps used. Poisons of various kinds have been recommended, but on trial they have proved worthless.

MUSKRAT, To Trap.—Find a log with some recent droppings of the muskrat on it, a notch is cut in the log for the trap, an inch or two under the water. The trap is fastened to a tally-stick. Thesetally-sticks are green saplings with a fork at the upper end, and a hook near the bottom to hold it in the loose ground. The chaining is slipped on to this tally-stick, and care is taken to so place the tally-stick and trap that when caught, the muskrat shall take to the water and be drowned. If on the land, among weeds and bushes, he will not unfrequently twist off his leg and escape. The traps are also placed in the runs, on bogs and old muskrat houses, and wherever there are recent indications that the muskrats come to feed. Where the game is scarce, the traps are sometimes baited, but otherwise this is not necessary. Carrots, parsnips, apples, potatoes, or a piece of the flesh of muskrat can be used for bait. A stick is stuck in the ground, slanting in such a manner that the end shall be 6 or 8 inches above the treddle of the trap. The bait is stuck on the end of the stick, and in this way, if there are any rats in the vicinity, you are pretty sure to catch them. Sometimes the traps are covered with an inch or two of weed; and some trappers put a drop or two of the oil, found in the glands of the muskrat, on or near the traps. The next morning the hunter takes his boat and visits his traps.

MUSKRATS, Home-made Trap for.—A trap equal if not better than a steel trap is an old bar-

rel. Sink it near the bank of the ditch, where there are evidences of the presence of the animals, to the level of the ground, and half fill it with water. Put in a couple of shingles, or light strips of board, to float on the water. Place sweet apples or carrots cut in small bits in the runs of the muskrats, and toll them to the barrel. Put several pieces upon the floats, inside. The rats will jump in after their food, and will not be able to get out. Where they are plenty, several muskrats may be taken in a night by this simple trap, it costs nothing but labor, can be visited at one's convenience, and there is plenty of room in it for a dozen or more at once.

MUSKRATS, To catch without Traps.—

It is a mystery to many how muskrats, beavers, and other animals, are able to stay so long under water, apparently without breathing, especially in winter. The way they manage is, they take in a good breath at starting, and then remain under water as long as possible. Then they rise up to the ice and breathe out the air in their lungs, which remains in a bubble against the lower part of the ice. The water near the ice is highly charged with oxygen, which it readily imparts to the air breathed out. After a time, this air is taken back in the lungs, and the animal again goes under the water, repeating this process from time to time. In this way, they can travel almost any distance, and live almost any length of time under the ice. The hunter takes advantage of this habit of the muskrat in the following manner. When the marshes and ponds where the muskrat abounds are first frozen over, and the ice is thin and clear, on striking into their houses with his hatchet, for the purpose of setting his trap, he frequently sees a whole family plunge into the water and swim away under the ice. Following one for some distance, he sees him come up to recover his breath, in the manner above described. After the animal has breathed against the ice, and before he has time to take his bubble in again, the hunter strikes with his hatchet directly over him, and drives him away from his breath. In this case he drowns in swimming a few rods, and the hunter, cutting a hole in the ice, takes him out.

MUSKRATS, To Skin.—The muskrat is usually skinned by beginning at the head, ripping from the chin to between the fore legs, and then stripping the skin off over the body. When taken off in this manner the skin is stretched on a bent rod of tough, pliable wood. When skinned from the tail it is stretched on a board.

MUSKRAT SKINS, To Tan with the Fur on.—First, for soaking, to 10 gallons of cold soft water add 8 parts of wheat bran, $\frac{1}{2}$ pint of old soap, 1 ounce of borax; by adding 2 ounces sulphuric acid the soaking may be done in one-half the time. If the hides have not been salted, add a pint of salt. Green hides should not be soaked more than 8 or 10 hours. Dry ones should soak till very soft.

For tan liquor, to 10 gallons warm soft water add $\frac{1}{2}$ bushel bran; stir well and let stand in a warm room till it ferments. Then add slowly 2½ pounds sulphuric acid; stir all the while. Muskrat hides should remain in about 4 hours; then take out and rub with a fleshing knife—an old chopping knife with the edge taken off will do. Then work it over a beam until entirely dry.

OTTER, To Trap.—Of all animals, the otter is the most cunning; its sense of smell is re-

markedly good. If a person visits an otter slide, they will leave it immediately, and perhaps not return for two or three weeks. They appear to have a natural dread of man, and in their travels, will scarcely ever follow the creek or river close by a house. They land some distance above or below the dwelling of their dreaded enemy, and transport their precious coats over land, through the fields, to the water again. To trap the otter is almost out of the question. You must take a large sized steel trap, set it, hang it over a fire and smoke it for two or three hours; then take a stick or board, and get into your canoe, (if you have one,) go to the place most frequented by them, and place the trap about 3 inches under water and carefully cover it with leaves, light trash or grass, which you can fish up from the bottom of the stream. Be very careful not to touch the bank above water, if you do, it is all over with you. He can read in the print of boot heels his death warrant, and he bids adieu to his haunts, and seeks a peaceful home many miles distant. In going to your trap, never go nearer than the opposite side of the stream. If Mr. Otter should accidentally put on a wristlet, he will make directly for his den. If the trap is not heavy enough to drown him, a weight can be attached to the chain.

OTTER, To skin.—This is done by ripping down the back of each hind leg until the slits meet in the crotch; skin the body whole; don't rip up the belly; put a split stick over the bone of the tail between the hide and body and skin in this way, when skinned draw the head over a stretcher and let it remain until dry.

OWL (The) To Catch.—Owls are very destructive to poultry, especially in the breeding season, and are much more dangerous than hawks, in as much as they pay their visits to the roosts in the night. There is no effectual safeguard against their visits unless you have the henry made owl-proof. Most farmers make their roosts under an open shed, or upon the trees, which are as free to birds of prey as to the hens. Chickens are very delicate food for young owls, and sometimes a dozen will be missing from the perch in a night, and their feathers and claws be found the next day in a neighboring owl's nest. Old hens will be taken and their heads be eaten off and the carcass be dropped under the tree, quite too heavy for the owl to carry off. Not a moment should be lost when these depredations occur. Tie the dead fowl upon the limb or the perch where it was accustomed to roost, and shut up the other fowls. The dead fowl should be tied in a roosting position, so, as to seem alive to the owl. Place a small steel-trap on the back of the hen and fasten it to a neighboring limb. The owl will generally make his appearance the following night, and in swooping down upon the back of the hen will find his claws securely fastened in the trap. A small rat-trap without teeth is the best. The teeth would be apt to cut off the legs or claws and release the owl. The trap will often save many days of hunting a mean, skulking enemy, who only plunders in the night.

PARCHMENT, How to make.—This article is manufactured from sheep skins, cleared from lime. The skin is stretched on a frame where the flesh is pared off with an iron circular knife; it is then moistened with a rag, and whitening spread over it; the workman then, with a large

pumice-stone, flat at the bottom, rubs over the skin, and scours off the flesh. He next goes over it with the iron instrument as before, and rubs it carefully with the pumice-stone without chalk; this serves to smooth the flesh side. He drains it again by passing over it the iron instrument as before; he passes it over the wool side, then stretches it tight on a frame. He now throws more whitening and sweeps it over with a piece of wooly lambskin. It is now dried, and taken off the frame by cutting it all round. Thus prepared it is taken out of the skinner's hands by the parchment maker, who, while it is dry, pares it on a summer (which is a calf-skin stretched on a frame), with a sharper instrument than that used by the skinner, who, working it with the arm from the top to the bottom of the skin, takes a way about half its substance, which leaves the parchment finished.

PRESERVING ANIMALS.—A mixture of equal parts of good commercial glycerine and water, to every gallon of which is added one ounce of the crystals of carbolic acid, constitutes a good preserving liquid for all animal substances. The use of pure glycerine, with about one-half pint of alcohol, and half a ounce of carbolic acid added to each gallon, makes an excellent mixture for preserving the tissues of soft animals, where it is important to preserve the color as well as the tissues.

RABBITS, To Trap.—To trap rabbits, take brass wire, make a noose, large enough for them to put their head through; then trim a small tree near their road, fasten the wire to the top, bend over and fasten by a notch to a peg driven in the ground; then make a fence of fine brush a little across their road, leaving a hole to hang the wire in.—Some use box traps, baited with sweet apple; also steel traps laid in their roads and fastened.

RACCOON, To Catch.—The surest way to catch them is with a good cur dog. One that will not give tongue on track but will bark at the tree. But if you wish to trap them with steel traps, go to the woods, near a swamp, find a big log lying in or near the swamp, set your trap on the log and then get two old limbs, set one on each side of the log over the trap, crossing at the top, forming an x, so that the coon will have to go under them and over the trap. Bait if you choose with frogs or chicken. But whether you bait or not the coon will run the old log if he comes in the neighborhood. Or on the same plan you can set a dead-fall.

RACCOON SKINS, To Prepare.—The skin of the raccoon should be nailed to boards to dry, then treated to a paste of 1 oz. alum; 1 oz. salt; about $\frac{1}{2}$ drachm sulphuric acid; 2 gills water and a little wheat bran. It should when dry be scraped off with a spoon or other thing as in case of mink skins. To work the skin soft, instead of nailing it on boards, roll it up and work it soft.

SALMON, Propagation of.—This salmon, like several other species of fish, possess the home sentiment in a marked degree. No matter how much it may wander, it will return to the same river, to its old spawning ground, in the season of procreation. It will go out of its river, and swim perhaps all over the ocean, and afterward return to the same river. It does not matter how much storm or turbid water it may be obliged to pass through when on the return

voyage, though he may not be able to see clearly a foot in front of him, he steers surely for his old home. The bottom of all rivers and creeks that have water adapted to salmon is dotted with springs; and these fish spawn and hatch wherever they find springy bottom, particularly at the heads of streams. The impression is prevalent that salmon spawn and hatch anywhere, for the reason that they are seen during the breeding season in many different parts of the river; but the fact is, they do not spawn in any place unless there is a spring close by or immediately beneath. I think the reason that salmon spawn near a spring consists in the fact, that if the eggs were deposited in a part of the stream which was free from springy bottom, many of them would become buried in sediment and not hatch out; but being deposited in the vicinity of or over springy bottom, they are kept clear from sediment by the upward burst of the water. In the great lakes the salmon appears to be strictly a shore fish, and has never been caught more than sixty rods from the shore, except in very rare instances. By the application of the improved methods of fish culture our waters can be restocked with salmon, and so the good old times of good fish, plenty and cheap, may be recovered. In the matter of artificial production, it may be unnecessary to say more than this, that salmon are bred artificially, and taken care of in precisely the same way as brook-trout.

SHEEP-SKINS, To prepare for Mats.—Make a strong lather with hot water, and let it stand till cold; wash the fresh skin in it, carefully squeezing out all the dirt from the wool; wash it in cold water till all the soap is taken out. Dissolve a pound each of salt and alum in two gallons of hot water, and put the skin into a tub sufficient to cover it; let it soak for twelve hours, and hang it over a pole to drain. When well drained, stretch it carefully on a board to dry, and stretch several times while drying. Before it is quite dry, sprinkle on the flesh side one ounce each of finely pulverized alum and saltpetre, rubbing it in well. Try if the wool be firm on the skin; if not, let it remain a day or two, then rub again with alum; fold the flesh sides together and hang in the shade for two or three days, turning them over each day till quite dry. Scrape the flesh side with a blunt knife, and rub it with pumice or rotten stone.

SHEEP-SKINS, To Tan.—Sheep-skins, which are used for a variety of purposes, such as gloves, book-covers, etc., and which, when dyed, are converted into mock Morocco leather, are dressed as follows: They are first to be soaked in water and handled, to separate all impurities, which may be scraped off by a blunt knife on a beam. They are then to be hung up in a close warm room to putrefy. This putrefaction loosens the wool, and causes the exudation of an oily and slimy matter, all which are to be removed by the knife. The skins are now to be steeped in milk of lime, to harden and thicken; here they remain for 1 month or 6 weeks, according to circumstances, and when taken out, they are to be smoothed on the fleshy side with a sharp knife. They are now to be steeped in a bath of bran and water, where they undergo a partial fermentation, and become thinner in their substance.

The skins, which are now called pelts, are to be immersed in a solution of alum and common

salt in water; in the proportion of 120 skins to 3 lbs. of alum and 5 lbs. of salt. They are to be much agitated in this compound saline bath, in order to become firm and tough. From this bath they are to be removed to another, composed of bran and water, where they remain until quite pliant by a slight fermentation. To give their upper surfaces a gloss, they are to be trodden in a wooden tub, with a solution of yolks of eggs in water, previously well beaten up. When this solution has become transparent, it is a proof that the skins have absorbed the glazing matter. The pelt may now be said to be converted into leather, which is to be drained from moisture, hung upon hooks in a warm apartment to dry, and smoothed over with warm hand-irons.

SKELETONS, Preparation of.—Skulls of animals may be rapidly prepared by boiling in water for a few hours. A little potash or lye added will facilitate the removal of the flesh.

Skeletons may be roughly prepared in the field by skinning the animal and removing all the viscera, together with as much of the flesh as possible. Whenever practicable, they should be allowed to soak a few hours in water to extract the blood. The bones should then be exposed to the sun or air until completely dried. Previously, however, the brain of large animals should be removed by separating the skull from the spine, and extracting the brain through the large hole in the back of the head. The head may be cleaned by boiling. In case it becomes necessary to disjoint a skeleton, care should be taken to attach a common mark to all the pieces, especially when more than one individual is packed in the same box.

Skulls and skeletons may frequently be picked up, already cleaned by other animals or exposure to weather. By placing small animals near an ant's nest, or in water occupied by tadpoles or small crustacea, very beautiful skeletons may often be obtained. The sea-beach sometimes affords rich treasures in the remains of porpoises, whales, large fishes, as sharks, and other aquatic species.

Although, to save time and opportunities in the field, it is usually necessary to prepare skulls by boiling in water, as just explained, the process is sometimes apt to leave the bones colored, or even somewhat greasy. The best method of preparing skulls and skeletons for a museum is undoubtedly, after cutting away the greater mass of flesh, that of macerating, or allowing them to remain in cold water until the decaying flesh separates from the bones. At first, the water, as it becomes charged with blood, is poured off and replaced by fresh; after this is repeated for a time, the flesh becomes bleached, and the bones may then be suffered to remain as long as necessary (sometimes for weeks), removing the specimen from time to time and scraping off the softening flesh. After this has been all removed and the bones well scrubbed under water with a stiff brush, they should be soaked a little longer to remove any remnant of infiltrated blood. During these operations, care must be taken not to injure or separate any of the ligaments. Shreds of tendon may be cut off with a sharp knife or pair of scissors. The ligaments may then, according to Eyton, be converted into a tough, leathery substance by immersion in a liquid prepared by making a saturated solution of common

alum and, when cold, diluting it with an equal quantity of water, and adding half an ounce of common salt for every half pound of alum. If the bones are free from blood, twenty-four hours' immersion will be sufficient; large birds or other animals may require nearly a week. When removed from the solution, the bones must be washed under a current of water, or in a basin, and then allowed to dry in any desirable position.

It is important, in preparing skeletons, not to allow the flesh to dry too soon on the bones, or, at least, to allow them to soak in water for a time before drying, as the subsequent operations will be rendered much easier.

Greasy skulls or bones can be readily cleansed by immersion in ether for a length of time. The ether should be kept in a tight jar, and every precaution taken to prevent undue proximity to a light or the fire, the vapor being exceedingly explosive. A simpler method consists in boiling them in a large quantity of water, having a little potash added.

SKINS OF ANIMALS, Composition of.—When fresh, from two-thirds to three-fourths of the weight of the skin consists of water; and if dried at 220°, it gradually absorbs water; but dried at the ordinary temperature, the moisture in it varies with the amount in the atmosphere. An analysis of a perfectly dried skin gave about 95 per cent. of gelatine tissue; 3 per cent. of cellular tissue not soluble in water; 1 per cent. of fat; and half of 1 per cent. of mineral material.

SKINS AND FURS, Coloring and Dyeing.—Furs are dyed by dealers to suit some fashion, to conceal defects, or to pass off inferior furs for better ones. The best way is to brush the dye over the fur with a good sponge, brushing with the hair. As a matter of course, you can only dye them of a darker color than they are, and retain the handsome lustrous look peculiar to fur. They may be bleached, but the process leaves the fur looking like coarse flax or even hemp. (*Blue.*) Sulphate of indigo (soluble indigo, sold by all druggists), is the readiest and best to get a blue with. Furs are never dyed blue for sale, for that would be spoiling a white fur, but sheepskins are. The skin should be dipped several times in a bath of hot alum water; allowed to drain, and then dipped into a solution of sulphate of indigo and water, with a few drops of sulphuric acid added; this gives a pale blue. Aniline blue is very fine, and dyeing with it is very simple. A solution of the color in water is made, a hot solution, and the skin put in all at once, (if a part of the skin is put in first that part will be darkest, so quick is the absorption of these colors.) Fancy sheep-skin mats, are colored blue, red, green, and yellow, and have a ready sale when they are new.—(*Black.*) The best black is obtained by first dyeing the skin a blue. Then boil one $\frac{1}{4}$ pound gall nuts, powdered, and $\frac{1}{4}$ ounce of logwood, in 3 gallons of water. If the flesh side is wanted blue, while the fur or wool is another, this decoction must be sponged on. Get the wool or hair, thoroughly impregnated with this and then add a $\frac{1}{4}$ pound copperas, to the dye, and go over the fur or wool many times with the sponge. The process above given will answer without previous blueing, but the black is not so brilliant. Another "home made" dye, which will answer for dyeing clothes a black, as well as sheepskins, is

this, just make a bath of 8 ounces of bi-chromate of potash, 6 ounces alum, 4 ounces fustic; boil in water enough to cover 5 pounds of yarn, cloth or a single sheep skin. Make another bath of 4 pounds of logwood, 4 ounces each bar wood and fustic, or 8 ounces fustic, same amount of boiling water, as last; stir the goods well around in the first bath, keeping the water hot for an hour, then work it in the second bath the same length of time. Take them and wring them; then adding $\frac{1}{4}$ pound of copperas, to the last bath, put the goods in again, and give them a good stirring. This is a good black dye for wool goods (or fur), but not for silks or cotton.—(*Red.*)—Furs of course are never dyed red, at least in this country. Sheep skins might be dyed with madder or cochineal, but in the former case, the skin would of necessity be boiled with the dye, as that is necessary in using madder. Cochineal would be expensive and require much working, while as brilliant reds and purples may be got from the aniline colors, dissolved in moderately warm water, the scum taken off, and skin dipped. These colors are the cheapest too, as they go very far. But always have the wool as free from grease as possible by working in weak hot lye or hot soapuds.—(*Yellow.*)—Can be got on sheep skins with black oak bark, (quercitron bark) old fustic, annatto, and Persian (also called French) berries. The skin should be previously dipped into a hot bath of alum, cream of tartar or spirit of tin, about 2 ounces to the gallon. About $\frac{1}{2}$ pound of annatto, or 1 pound of the other articles, are enough for a single skin. If you wish to use fustic, be particular to ask for old fustic, as what is known in the trade as young fustic, is a different article and gives a different color. There is also now an aniline yellow which works like the other colors.—(*Green.*) Dye first blue as explained above, then pass through a yellow dye, until you get the shade required. An alum bath, cream of tartar, or spirits of tin, as above, must be used before the blue is given.

SKINS AND FURS, Dressing and Tanning.—The cheapest and readiest as well as the best method of dressing skins for use with the hair or wool on, is to first scrape off all the fat with a knife rather blunt on the edge, as not to cut holes into the hide, upon a round smooth log. The log for convenience sake should have a couple of legs in one end, like a trestle; the other end should rest upon the ground. After the fat is well cleaned off, take the brains of the animal, or the brains of any other recently killed, and work them thoroughly into the hide. This renders the hide pliable. Then to preserve from the ravages of insects scatter on it some powdered alum and a little saltpeter. If the hair side has become greasy, a little weak lye will take it out. Sheepskins may be dressed in the same way, though the wool should be cleaned with soapuds before using the brains. Another way but more expensive, is to use a paste made of the yolk of eggs and whiting instead of brains, working it in the same way, letting it dry and brushing off the whiting. Then add the powdered alum as before. Deerskins and even small calf skins are often tanned as the process is called with the hair on for garments. If it is desired to give the deerskin a yellow color, yellow ochre or chrome yellow may be used in combination with the brains or yolks of eggs, and afterward brushed off.

If it is simply desired to preserve skins until they are sold, it is only necessary to dry them thoroughly. If the weather should be damp and warm, salt the flesh side slightly with fine salt.

SKINS, Preservatives for.—The best material for the preservation of skins of animals consists of powdered arsenious acid, or the common arsenic of the shops. This may be used in two ways; either applied in dry powder on the moist skin, or, still better, mixed with alcohol or water to the consistency of molasses, and put on with a brush. Some camphor may be added to the alcoholic solution, and a little strychnine will undoubtedly increase its efficacy. There are no satisfactory substitutes for arsenic; but, in its entire absence, corrosive sublimate, camphor, alum, etc., may be employed. Many persons prefer the arsenical soap to the pure arsenic. This is composed of the following ingredients: arsenic, 1 ounce; white soap, 1 ounce; carbonate of potash, 1 dram; water, 6 drams; camphor, 2 drams. Cut the soap into thin slices, and melt over a slow fire with the water, stirring it continually; when dissolved, remove from the fire, and add the potash and arsenic by degrees; dissolve the camphor in a little alcohol, and when the mixture is nearly cold, stir it in.

The proper materials for stuffing out skins will depend much upon the size of the animal. For small birds and quadrupeds, cotton will be found most convenient; for the larger, tow; for those still larger, dry grass, straw, sawdust, bran, or other vegetable substances, may be used. Whatever substance be used, care must be taken to have it perfectly dry. Under no circumstances should animal matter, as hair, wool, or feathers, be employed.

The bills and loral region, as well as the legs and feet of birds, and the ears, lips, and toes of mammals, may, as most exposed to the ravages of insects, be washed with an alcoholic solution of strychnine applied with a brush to the dried skin; this will be an almost certain safeguard against injury.

SKINS (Small), Stretching and Curing.—The market value of a skin is greatly affected by the care taken in removing it from the animal, and in drying it. The common way is to tack the skin to the barn-door and let it remain stretched until quite dry. The trapper in the woods, having no such convenience as the barn-door at hand, is obliged to resort to other methods. One plan is to dry the skin on a hoop. A skin to be dried in this manner must not be ripped down the belly, but it is cut from the lower jaw of the animal to just below its fore-legs; the lips, eyes, and ears being cut around, the skin is stripped off, leaving the fur side inward. The hoop consists of a branch of hickory or other elastic wood, an inch through at the butt. This is bent and pushed into the skin, which is drawn tight, and fastened in place by notches in the bow, drawing the skin of the lip, into these notches. A much neater way, and one generally preferred, is to use stretchers of thin wood. As these have to be carried by the trapper, they are made of light wood and very thin. They are three-sixteenth of one inch thick, 20 inches long, 6 inches wide at the larger end, and slightly tapering. They are rounded to a blunt point at the lower end, and the edges chamfered. The skin is drawn over the board, and secured with tacks. Skins stretched by either of these me-

thods should not be dried in the sun nor by a fire, but in a cool place where they will be sheltered from the rain. No salt or other preservative is used upon skins intended for the market.

SKUNKS, To Trap.—Take an old barrel, and place it on its side on a triangular stick of wood about 7 inches high fastening the bait on the bottom of the barrel. When the skunk goes for this bait as soon as he passes the centre the barrel turns up with the skunk, without making any scent. Then take it by the tail and do with it as desired. Care must be taken not to place the barrel too high, as it might throw over and not remain upright. The more skunks you catch in the same barrel, the better the trap.

SKUNK SKINS, To Deodorise.—To deodorise skunk skins or articles for clothing scented, hold them over a fire of red cedar boughs, and sprinkle with chloride of lime; or wrap them in green hemlock boughs, when they are to be had, and in 24 hours they will be cleaned.

SNARES.—Snare are not very certain, but they are little trouble to make. They must be set in the paths or runs of the birds it is intended to take. They are of horse hair or thin copper wire tied in a running knot. The tendency of every bird when it finds itself touched about the head is to push forward. This draws the knot tighter, until the bird kills itself.

SNIPES, How to Shoot successful.—To the beginner no bird is more puzzling, and, therefore, more difficult to shoot. Its flight is most uncertain, most variable, and most irregular—rising at one time as evenly as a lark, and flying close to the ground with scarcely the slightest deviation from a straight line; at another, springing from the ground as if fired from a gun, and then flying in a zigzag course to the right or left, and, indeed, in every direction; and sometimes, again, rising to a great height, and then going straight away with the rapidity of lightning. And yet, with all these apparent difficulties, when the knack is once acquired, it becomes comparatively easy—indeed, is reduced almost to a certainty: the great art in this kind of shooting is coolness and to avoid too much hurry. And, in this, as in every other kind of shooting, the first sight is the best: the moment you are "well on" your bird, the trigger should be pulled. In cross-shots, fire well before your bird. Contrary to the usual practice, you should always walk down wind; the reason for this is that snipe always rise against it. Sometimes snipe are very wild, and at others will lie until they are almost trodden upon. If there be much wind, your best chance is to "down with them" as soon as they rise from the ground, or you have little hope of getting a bag.

SOAP, Arsenical.—This soap, used for preparing the skins of birds and other small animals, is made by taking of carbonate of potassa 12 oz., white arsenic 4 oz., white soap 4 oz., lime (slacked in the air) 4 oz., camphor (powdered) $\frac{3}{4}$ oz., water sufficient to make the whole into a paste.

SQUIRRELS, To Trap.—In trapping squirrels, set a steel trap on the upper rail of a fence near where they frequent; set a pole with an ear of corn, or some other squirrel food fastened to the end of it, up against the side of the fence, leaning in such a position as to spring the bait over the trap at a height of six or nine inches; when the squirrel reaches to get the bait he will get into the trap.

SQUIRREL SKIN, To Tan.—Place them in a vessel with strong wood ashes. Wet the ashes till they will make a mortar. Leave them in about nine days, or until the hair can be pulled off; take them out and remove the hair. Then place them in strong, soft soap six days; then remove and wash them in cold water till all the soap is out of them. When nearly dry, rub them with the hands till dry. (*With the hair on.*) Place the hide on a smooth, round sided slab, made for the purpose, with two legs in one end, and let the other end rest on the ground; drive a nail in the upper end to hold the skin from slipping while fleshing. Scrape off all the flesh with a blunt knife, being careful not to tear the hide. Then take the brains of the squirrel and work them thoroughly into the skin; this renders the skin pliable. Then scatter on some powdered alum and a little saltpeter. Let dry; then stretch and work it until as pliable as may be desired.

TANNING, Chemistry of.—The skins of animals are constituted mainly of glue or gluten. This is soluble, and the principle derived from the bark, tannin, or tannic acid, is also to a considerable extent soluble. When the latter is allowed to act upon the former, chemical combination takes place, and leather is produced which is wholly insoluble.

TAN BARK.—The tannin properties of bark mainly consist of the inner lining of the same; a great saving in transportation would be made by separating the inner from the outer coating before sending to market. It is also recommended that this liber be ground to a very fine powder, in order that its virtues may be the better extracted, and that it be transported in barrels, to protect it from moisture, and the better to prevent the oxygen of the air from acting on the tannin, and thus converting it into gallic acid.

TANNING, Operation of.—The first operation is to soak the hide, as no hide can be properly tanned unless it has been soaked and broken on a fleshing beam. If the hide has not been salted add a little salt and soak it in soft water. In order to be thoroughly soaked green hides should remain in this liquor from 9 to 12 days, of course the time varies with the thickness of the hide. The following liquors are used to remove hair or wool, viz: 10 gallons cold water (soft), 8 quarts slacked lime, and same quantity of wood ashes. Soak until the hair or wool will pull off easily.

As it frequently happens it is desirable to cure the hide and keep the hair clean, the following paste should be made, viz: Equal parts of lime and hard wood ashes (lime should be slacked,) and made into a paste with soft water. This should be spread on the flesh side of the hide and the skin rolled up flesh side in and placed in a tub just covering it with water. It should remain 10 days or until the hair will pull out easily, then scrape off with a knife.

TANNING, without the Wool or Hair.—The skins are first soaked in warm water, scraped on the flesh side to get off fat, and hung in a warm room until they begin to give a slight smell of hartshorn. The wool or fur then comes off readily. The hair side should now be thoroughly scraped against the hair. The skin is next soaked two or three weeks in weak lime water, changing the water two or three times. Then they are brought out again, scraped smooth and trimmed.

Then rinsed in clean water, then soaked in wheat bran and water for two or three weeks. After this they are well stirred around in a pickle of alum, salt and water. Then they are thrown again into the bran and water for two or three days. Then stretched and dried somewhat in a warm room. After this they are soaked in warm water and then worked or trodden on in a trough or pail filled with yolk of eggs, salt, alum, flour and water, beaten to a froth. They are finally stretched and dried in an airy room, and last of all smoothed with a warm smoothing iron. This makes the beautiful leather we see in gloves, military trimmings, etc. The proportions for the egg paste are as follows: $3\frac{1}{2}$ pounds salt, 8 pounds alum, 21 pounds wheat flour and yolks of nine dozen eggs. Make a paste with water, dissolving first the alum and salt. A little of this paste is used as wanted with a great deal of water.

Chamois skins and deer skins not wanted for gloves, are similarly treated up to the point of treating with egg paste. Instead of using this process they are oiled on the hair side with very clean animal oil, rolled into balls and thrown into the trough of a fulling mill, well beaten two or three hours, aired, re-oiled, beaten again and the process repeated a third time. They are then put into a warm room until they begin to give out a decided smell, then scoured in weak lye to take out superfluous grease. Here the intention is merely to get a thick felt-like skin of good color, a nicely grained surface is not required as in gloves. The skins are finally rinsed, wrung out, stretched and dried, and when nearly dry slightly rubbed with a smooth, hard round stick.

These are the fine processes. A dried skin oiled so as to become smooth and pliable will retain the hair or wool a considerable time. Or it may be made more durable where the color of the flesh side is no object by scraping, washing in soap suds and then putting directly into the tan pit. For ordinary purposes rabbit, squirrel and other small skins can be efficiently preserved with the hair by the application of powdered alum and fine salt, put on them when fresh, or if not fresh by dampening them first. Squirrel skins when wanted without the hair will tan very well in wheat bran tea, the fat and hair having been previously removed by soaking in lime water and scraping. Old tea leaves afford tannin enough for small skins but they give a color not nearly so pleasant as bran. Almost any of the barks afford tannin enough for small skins, willow, pine, poplar, hemlock of course, sumach, etc.

TANNING, without Bark or Mineral astringents.—The astringent liquor is composed of water, 17 gallons; aleppo galls $\frac{1}{2}$ lb.; Bengal catechu, $1\frac{1}{2}$ oz. and 5 lbs. of tormentil, or sept-foil root. Powder the ingredients, and boil in the water 1 hour; when cool, put in the skins (which must be prepared by being plunged into a preparation of bran and water for 2 days previously); handle them frequently during the first 3 days, let them alone the next 3 days, then handle three or four times in one day; let them lie undisturbed for 25 days more, when the process will be complete. — (*Canadian Process.*) — The Canadians make four liquors in using the japonica. The first liquor is made by dissolving, for 20 sides of upper, 15 lbs. of terra japonica in sufficient water to cover the upper, being tanned. The

second liquor contains the same amount of japonica, and 8 lbs. of saltpetre also. The third contains 20 lbs. of japonica, and $4\frac{1}{2}$ lbs. of alum. The fourth liquor contains only 15 lbs. of japonica, and $1\frac{1}{2}$ lbs. of sulphuric acid; and the leather remains 4 days in each liquor for upper; and for sole the quantities and time are both doubled. They count 50 calf skins in place of 20 sides of upper, but let them lie in each liquor only 3 days.

TANNING, Curriers Size for.—Take of sizing, 1 quart; soft-soap, 1 gill; stuffing, 1 gill; sweet milk, $\frac{1}{2}$ pt.: boil the sizing in water to a proper consistence, strain, and add the other ingredients; and, when thoroughly mixed, it is ready for use.

TANNING, Curriers Paste for.—First Coat. Take of water, 2 quarts; flour, $\frac{1}{2}$ pint; Castile soap, 1 oz.: make into paste. Second Coat. Take of first paste, $\frac{1}{2}$ pt.; gum-tragacanth, 1 gill; water, 1 pt.: mix all together. This will finish eighteen sides of upper.

TANNING, Curriers Skirting for.—This is for finishing skirting and the flesh of harness leather, in imitation of oak-tanning. Take of chrome yellow, $\frac{1}{2}$ lb.; yellow ochre, 1 lb.; cream of tartar, 1 oz.; soda, $\frac{1}{2}$ oz.; paste, 5 qts.: mix well. This will finish twelve sides. *For the Grain to imitate Oak Tan.*—Take of chrome yellow, $\frac{1}{2}$ lb.; yellow ochre, $\frac{1}{2}$ lb.; cream of tartar, 1 oz.; soda, 1 oz.; paste, 2 qts.; spirits of turpentine, 1 pt.: mix well. This will finish twelve sides.

TRAPPERS, Hints to.—(Valuable terms: *Worthless Skins.*) The skins of animals trapped are always valued higher than those shot, as shot not only make holes, but frequently plow along the skin making furrows as well as shaving off the fur. To realize the utmost for skins they must be taken care of, and also cleaned and prepared properly. Newhouse gives these general rules derived from experience.

1. Be careful to visit your traps often enough, so that the skin will not have time to get tainted.
2. As soon as possible after an animal is dead and dry, attend to the skinning and curing.
3. Scrape off all superfluous flesh and fat, and be careful not to go so deep as to cut the fiber of the skin.
4. Never dry a skin by the fire or in the sun, but in a cool, shady place, sheltered from rain. If you use a barn door for a stretcher (as boys sometimes do), nail the skin on the inside of the door.
5. Never use "preparations" of any kind in curing skins, nor even wash them in water, but simply stretch and dry them as they are taken from the animal.

TRAPPING, Season for.—All furs are best in winter; but trapping may be carried on to advantage for at least six months in the year, i. e. any time between the first of October and the middle of April. There is a period in the warm season, say from the first of May to the middle of September, when trapping is out of the question, as furs are worthless. The most trapping is done late in the fall and early in the spring. The reason why furs become worthless in summer is, that all fur-bearing animals shed their coats, or at least lose the finest and thickest part of their fur as warm weather approaches, and have a new growth of it in the fall to protect them in winter. This whole process is indicated in the case of the muskrat, and some other animals, by

the color of the inside part of the skin. As summer approaches, it becomes brown and dark. That is a sign that the best fur is gone. Afterward it grows light-colored, and in winter when the fur is in the best condition it is altogether white. When the pelt is white it is called *prime* by the fur-dealers. The fur is then glossy, thick, and of the richest color, and the tails of such animals as the mink, marten, and fisher are full and heavy. Beavers and muskrats are not so strongly prime all about the middle of winter. Other animals are prime about the first of November. There is probably some variation with the latitude, of the exact period at which furs become prime, the more northern being a little in advance. Trappers are liable to begin trapping too early in the season, consequently much of the fur is caught which must be sold at low prices, and is unprofitable to the trapper, the fur-trader, and the manufacturer.

TRAPS, SETTING.—The first thing to remember in setting your trap, is that the animal will go to it, second, that it shall catch him when he crosses, and last that he shall not be able to get away, when once caught. Next it is necessary always to smoke the trap in burning hemlock, cedar, or juniper brought, dipped in the blood of pigs that have just been killed, or letting the blood of a chicken run over it, dipping it in melted fat or rubbing it while warm with a ball of bees-wax. But remember that in baiting a rabbit trap your hands must never be greasy; there is nothing a rabbit will so quickly avoid as grease of any kind.

Now having arranged this, your next business must be to induce your animal not to be shy. If you are carrying on trapping in wild woods the surrounding scenery is generally wild enough, but near at home, on the farm care must be taken to take away the appearance of preparation, and yet preparation must be made. A cautious animal such as a fox or raccoon, should be invited to come several times before the trap is set; arrange a place with sawdust, hay-seed, chaff, and chicken feathers, several inches deep, water through it food adapted to the animal intended to be caught, offal of chickens, bones, and bits of waste meat, fish heads, etc., if for fox; shavings of corn, etc., for coon, leave it and when you have certain indications, set your trap (free from the iron smell) and cover with the material you have used, scattering bits of food therein as before, the creature you are after, will probably be there the next morning, if you have properly secured your trap. Another way is to set your trap under water two or three inches with the bait above it, hung upon a sapling or spile so as to make the animal stand upon the trap to get it, or to plant your trap well covered at the foot of an old stump, by the side of a sapling, by the side of a barn, hay-stack, smoke house, pig pen, but always covering the trap and hanging the bait above it, so as to make the animal step into it.

Last of all you must secure the trap by a weight of wood or metal, by a bent sapling that pulls it up into the air, or by a weight or stick that will pull it into the water and drown it. A short light chain ought to be attached to every trap of iron, as animals gnaw with ease through anything like rope or hide. If you are catching animals only to get rid of nuisance, no spring is necessary, but want to hoist the land animal into

they cannot damage themselves, and if water animals, you want to drown them quick, the former result is attained by bending over a sapling with a stout cord attached containing the bait, a portion of the cord continues down to the trap and is fastened slightly by a notched peg driven into the ground, when the animal is caught its struggles free the cord, and the sapling springs back and hoists it into the air. If your trap is set in water it may be fastened by a ring at the end of the chain to a pole running out into deep water, the pole should be fastened into its position and securely anchored, or the whole thing may be rolled far down the stream when you come to look for it; the struggles of the animal caught cause the ring to go farther and farther down the stick and the weight of the trap finally drowns the animal.

TRAPS, Baiting.—Strong smelling substances are the best baits, other things being equal; and if the smell of the kind of animal to be caught can be given to the bait in any way, it will be sure to lure the animal to the trap. If a fox skin be dragged along the ground in the direction of the trap, every fox striking the trail will follow it up. So it is with other animals. Beaver bait is made thus: The castor or bark stone, which is found in the male beaver, is pressed from the bladder-like bag which contains it into a vial with a wide mouth. Five or six of these stones are taken, and a powdered nutmeg, a dozen or more cloves, a teaspoonful of ground cinnamon, all mixed with alcohol or whisky until it is about as thick as good syrup, cork the bottle and keep three or four days. In using this it should be employed for attracting the beaver toward the trap, but not be put into it. For the beaver has a habit when he smells the bark stone of another beaver of covering it with leaves and twigs and then voiding his own bark-stone or scent upon it. Doing this, he would be more likely to cover the trap than to be caught. What the object of this is of course unknown; but it is similar to the voiding of urine by dogs, foxes and wolves in spots already used by another animal for the same purpose.

But the beavers will take any fresh root or sapling for bait. The muskrat will take carrots, potatoes, apples, or any similar food. All of the weasel tribe—the mink, sable, fisher, skunk, ordinary weasel, etc., will take fish, fresh or salt. When using the latter, it should be toasted, so as to emit more smell. Old hunters, to get a good "fish smell," cut up any small fish, put the pieces into a bottle, and let it be in as warm a place as convenient for several days. As it decays the fish oil rises, and this oil they put on any bait they happen to have. All of the weasel tribe, as well as foxes and wolves, are fond of any kind of fowl. The heads and legs and any other waste parts of both wild and domestic fowl are the best of bait. Even feathers scattered around the trap make the thing more attractive and real. A little musk mixed with assafetida, or mixed like the bark-stone, or even a muskrat skin, fixed so as to drag along the ground toward a trap, will make most of this tribe, as well as the fisher, follow it up to the trail. A strong piece of codfish will do the same. Some old hunters just keep one of these trail-bags tied by a string to their belt and let it drag as they go from trap to trap. This multiplies their chances of having something in them next morning. An-

other secret of old hunters is to take the parts peculiar to the sex of the female wolf, fox or dog, and preserve it in alcohol or whisky for use. A small piece of this is used in drawing either fox or wolf to traps, and proves irresistible to the male, and no matter from which species it is taken, it proves alike attractive to either fox or wolf. It is not used as a bait that is as food, but as the trail or drag is to bring the animal toward the trap. The trap may be baited as usual, or this substance may be suspended over the trap; in trying to reach it to smell at it, the animal steps into the trap. Foxes, wolves and all the weasel tribe will take flesh and fish of any kind with this exception; foxes, wolves (and dogs) will not eat their own kind; weasels of every kind will. Toasted cheese forms a strong allurement for a fox. The bear will go anywhere for honey, and it is usual to smear this over a piece of pork or beef, or even upon an ear of corn, or just to smear it on the tree or stump near where the trap is set. The skunk considers mice a dainty, and raccoons will travel far for frogs, fish (broiled), salt or fresh; but an ear of corn is not disdained by him. Squirrels take Indian corn, nuts, etc. Woodchucks will take roots, corn and bread. Wild cats take flesh or fish of any kind. In the northwest they are also taken with the bark-stone bate previously described. In arranging traps for small birds hemp-seed will be found more attractive than any other. Buckwheat is perhaps more attractive for quails than any other grain. The partridge—also called pheasant in some places—may be caught with an apple once in a hundred years. We think even that unlikely. Otters, also, can be caught with the various grains—the small grains being best.

TRAP SPRINGS, To Temper.—See "Workers in Metals" department.

TRAP, Dead Fall.—The simplest dead fall is made with one log, heavy enough to hold the creature which it is proposed to trap. Cut a notch into a stump, or drive a short stake with a notch in it, or fasten the log with a withe to a stake or sapling, or in any case allow it a hinge-like motion. This is done with the log lying on the ground. Raise one end and support it upon a figure four, baited of course (see description hereafter). The bait stick of the figure four must be at right angles with the log, and enclosed with stakes or otherwise to allow the animal to approach only from one side, and obliging it to stand across the line in which the log would fall. Another way is to arrange two logs, one to fall on the other in the same way. Stakes may be driven at the side, if found necessary, to insure one log falling on top of the other.

TRAP, FARMERS, For Mink, Weasels, Skunks, etc.—Take boards $\frac{1}{2}$ inch thick, and make a box the two sides and top 12 inches long, with one end closed; the size of the box inside being 4 inches square. A steel spring is fastened on the closed end of the box, to which is fastened a square ring at its extremity, through which the game thrusts its head to reach the bait at one end of a catch, which holds the ring depressed and held by a wire running from the front end of the trap to the catch on the upper extremity of the bait hook. One who has tried it extensively says: "This is the best trap for skunks in the world, I believe. I have used many different kinds, but none work so well as this. You can set it at the hole in a wall or fence. It is sure fire."

TRAP, Figure Four.—The "figure four" which forms the basis in the construction of a large variety of traps, is made of three sticks—an upright, a diagonal piece and the trigger or horizontal piece. The first may be made say 8 inches in length, the upper end being whittled to a thick edge—not a point. The horizontal piece or trigger, about 10 inches long and square, has a notch on one side, about 7 inches from one end. On the upper face of the trigger, about $6\frac{1}{2}$ inches from the side notch, is another notch. The diagonal has both ends beveled or brought to a wide edge, and a notch cut near one end. In setting up the figure hold the perpendicular up, fit the trigger to its side, then adjust the notch in the diagonal to the perpendicular, and then insert the other end of the diagonal in the notch near the end of the trigger. Now let the lid of the trap or the fall, whatever it may be, rest on the end of the diagonal immediately over the trap; this makes the figure four stand firmly, yet ready to fall at a very slight pull upon the trigger, to which the bait is fastened—the trigger extending some 3 inches from the perpendicular.

TRAP, Sieve.—Take a large sieve and prop it up with a stick to the middle of which one end of a piece of string is tied. Strew some crumbs of bread or seeds under the trap, and also a few near by, and taking the other end of the string in your hand, retire and conceal yourself at some distance until the birds are attracted by the bait. As soon as you perceive them feeding directly under the trap, jerk the string quickly and the sieve falls. This is the simplest of boy's traps, but answers very well when there is time to spare. When a chicken is wanted about the farm-house, it is often time saved to catch it in this way.

TRAP, Quail.—A quail trap may be any kind of coop, supported by a figure 4. The spindle of the figure must either be so made as to hold grain, or, what is better, some grains of wheat or buckwheat are strung over a strong thread with the aid of a needle and tied to the spindle. Quails and prairie hens easily enter a trap when the ground is covered with snow. At other times it is rather difficult to catch them.

TRAP, Wild Turkey.—A wild turkey trap is made by first digging a ditch; then over one end is built a rude structure of logs, covered at the top. The structure should not be tight, but, of course, sufficiently close not to let the birds through. Indian corn is scattered about and in the ditch, and in the inside of the pen. The turkeys follow up corn in the ditch, and emerge from it on the inside. Once there, the silly

birds never think of descending into the ditch, but walk round and round the pen, looking through the chinks of the logs for escape that way. To make all sure, the ditch should end about the center of the pen, and a bridge of sticks, grass and earth should be built over the ditch, just inside of the pen, and close to the logs. Otherwise in going around the bird might step inside the ditch, and once there, it would follow the light and thereby reach the outside of the pen.

TROUT BREEDING.—The experience of a breeder on Long Island is as follows: He has put in use a race with a floor of slats; and upon the slats a layer of gravel of the size preferred by the fish for spawning ground. The water is admitted from a powerful spring "piped" to the spot, (and from other springs in the bottom,) beneath the floor of slats, and wells up with great uniformity through the entire mass of gravel, so that everywhere there is an upward rising, yet very gentle, current. This race is 290 feet in length, varying from 4 to 8 feet in width; the water standing from 12 to 18 inches deep over the gravel, and having a very perceptible flow at the outlet where the race is widest. Below the race is the nursery, a low building, 100 feet in length by 10 in width, made of rough boards, and entirely occupied by the water-course and a narrow walk. From the nursery the water flows through "the brook," a boarded, roofed, and gravelled channel, 500 feet long, to its outlet into the main pond. This is a beautiful sheet of the purest water, long and narrow, doubling upon itself, and filled with breeding trout, some of which are of very large size. The parent trout seek the race of their own accord and make hardly any nests in this beautifully clean and well-prepared bed, but lay indiscriminately anywhere. The eggs disappear among the gravel, and are not touched. The old fish return to the pond, and, after the laying season, are shut off. The race is roofed in its entire length, the roof being movable, and not entirely excluding the light. The feeding of the fry takes place at certain spots in the race, and here the largest quantity of excrement accumulates. The upward flowing water makes it easy to collect and remove this, but the fry are chiefly fed in the nursery.

VELLUM, To make.—This is a species of parchment made of the skins of abortives, or sucking calves; it has a much finer grain, and is white and smoother than parchment, but is prepared in the same manner, except its not being passed through the lime-pit. The article is used for binding superior books, and covering of drum heads.

INKS AND BLACKING.

BLACKING.

BLACKING, Preliminary remarks on making.—To produce a first-rate article of blacking it is absolutely necessary that the ingredients be of the best quality, and used in the proper proportions; and that the order of their admixture, and the general manipulations, be conducted,

under ordinary circumstances, in the manner described in the first of the following formulas. The proportions of the molasses and the oil, the most expensive of the ingredients should not be stinted; and, indeed, that of the latter may be safely increased in quantity, without materially affecting the polish, and with manifest advantage as far as the softness and durability of the leather

to which it is applied, is concerned. The manipulations required in the manufacture of both paste blacking and liquid blacking, are essentially the same; the difference between the two articles, when the same materials are used, depending entirely on the quantity of liquid added. Thus, by diluting paste blacking with water, vinegar, or beer bottoms, it may be converted into liquid blacking of a nearly similar quality; and, by using less fluid matter, the ingredients of liquid blacking will produce paste blacking. One thing must, however, be observed, and that is, that the ivory-black used for liquid blacking should be reduced to a much finer powder than for paste blacking; as, if this is not attended to, it is apt to settle at the bottom, and to be with difficulty again diffused through the liquid. Persons who object to the use of blacking containing oil of vitriol, will find recipes in which it is omitted below. The vitriol, however, greatly contributes to promote the shining properties of the blacking; and in small quantities, or in the proper proportion, is not so injurious to the leather as some persons have represented; as it wholly unites itself to the lime of the bone-phosphate contained in the ivory-black, and is thus neutralized, insoluble sulphate of lime, and an acid-phosphate, or super-phosphate, being formed. It is the latter that gives the acidity to a well made sample of blacking, and not the sulphuric acid originally added to it. In this way, the larger portion of the ivory-black is reduced to a state of extremely minute division, and with the other ingredients forms a strongly adhesive paste, which clings to the surface of the leather, and is susceptible of receiving a high polish by friction when in a scarcely dry state. This is the reason why lamp-black should never be employed for blacking to the exclusion of the necessary proportion of bone-black, as it has no earthly base to absorb or neutralize the acid, which, if left in a free state, would prove very hurtful to the leather. Oil of vitriol is now employed in the manufacture of all the more celebrated and expensive blackings; and that, simply because no other substance is known so efficient, and so little injurious to the leather. In the common blackings of Germany, hydrochloric acid is often used to the entire exclusion of oil of vitriol; but blacking so prepared possesses several disadvantages from which the better qualities are free. In the best German blackings only a small portion of this acid is used. The addition of white of egg, isinglass, and similar articles to blacking, always proves injurious, as they tend to stiffen the leather, and to make it crack, without at all improving its polishing properties. Even gum-arabic, in quantity, is on this account, objectionable. Oil has an opposite tendency, and, as already stated, the quantity commonly used may be increased with advantage. Resin oil should be particularly avoided.

The only improvement that has been introduced in the manufacture of blacking, since the early days of the celebrated Day & Martin, is, a few hours after the conclusion of the mixture of the ingredients, but before adding the vinegar, if any, to simmer the whole very gently, for about 8 or 10 minutes, observing to stir it assiduously all the time. The fire must then be withdrawn, and the pan covered over until it is quite cold, when half an hour's lusty stirring will finish the process. In this way a degree of

maturity and brilliancy will be imparted to the product, which without the application of heat, it would take months to acquire, if indeed it ever reached it.

As it is generally more convenient to measure than to weigh liquids, it may be useful to remember that, in round numbers:

1 gal. of oil	weighs	9½ pounds.
1 " sour beer	"	10¼ "
1 " vinegar	"	10 "
1 " water	"	10 "

We may here further remark that the blackings of different houses vary considerably in some of their properties; as also do those of even the same maker by age. Some blackings dry off rapidly, and give a very brilliant polish with very little labor; while others take a little longer to dry off, and somewhat more labor to polish them. The former are best adapted to hasty use, and when a very brilliant surface is desired; the latter, when depth of polish, without extreme brilliancy, satisfies the wearer. The first meets best the requirements of fashionable life; the last, those of the middle classes and pedestrians exposed to dirt, mud, and the various vicissitudes of travelling and weather. Time, however, equalizes the qualities of these two classes. Blackings which are crude, moist, and oily, lose these properties, and become drier and more brilliant by age. The practice of several of the first-class London boot and shoemakers is never to use a blacking which they have not had in their stock at least a twelvemonth.

Blacking, both liquid and paste, should be stored in a cool and moderately dry cellar; and when in use should be kept corked or otherwise excluded from the air. Exposure or desiccation destroys most of its best qualities.

AUTOMATIC or Self-Shining.—1. Gum-arabic, 4 oz.; molasses or coarse brown sugar, 1½ oz.; good black ink, ¼ pint; strong vinegar, 2 oz.; rectified spirit of wine and sweet oil, of each 1 oz.; dissolve the gum in the ink, add the oil, and rub them in a mortar, or shake them together for some time, until they are thoroughly united; then add the vinegar, and lastly, the spirits.

2. Lamp-black, ¼ oz.; indigo in fine powder, 1 dr.; put them in a mortar, or basin, and rub them with sufficient mucilage (made by dissolving 4 oz. of gum in ¼ pint of strong vinegar) to form a thin paste; add very gradually, of sweet oil, 1 oz.; and triturate until their union is complete, adding toward the end the rest of the mucilage; then further add of molasses, 1½ oz.; and afterward, successively, of strong vinegar, 2 oz.; rectified spirit, 1 oz.; lastly, bottle for use.

3. Mix the whites of 2 eggs with a tablespoonful of spirit of wine, 2 large lumps of sugar crushed, and sufficient finely powdered ivory-black to give the required color and thickness, avoiding excess.

The above are chiefly used for dress boots and shoes. The first two are applied to the leather with the tip of the finger, or a sponge, and then allowed to dry out of the dust. The third is commonly laid on with a sponge or soft brush, and when almost dry or hard may have its polish heightened with a brush or soft rubber, after which it is left for a few hours to harden. It may also be used to revive the faded black leather seats and backs of old chairs. They all possess great brilliancy for a time; but are only adapted

to clean, dry weather, or indoor use. They should all be applied to the leather as thinly as possible, as otherwise they soon crack off.

BALLS, Heel.—1. Mutton suet, 4 oz., bees'-wax, 1 oz., sweet oil, 1 oz., oil of turpentine, $\frac{1}{2}$ oz., melt and add gum Arabic, 1 oz., lamp black, $\frac{1}{2}$ oz.

2. Bees'-wax, 8 oz., tallow, 1 oz., melt and add powdered gum Arabic, 1 oz., lamp black to color. Used by shoemakers, and to copy inscriptions, or raised patterns, by lying paper on the pattern and rubbing the ball on it.

CAOUTCHOUC, Blacking.—18 ounces of caoutchouc are to be dissolved in about 9 pounds of hot rape oil. To this solution 60 pounds of fine ivory black and 45 pounds of molasses are to be added, along with 1 pound of finely-powdered gum arabic, previously dissolved in 20 gallons of vinegar. These mixed ingredients are to be finely triturated in a paint-mill, till the mixture becomes perfectly smooth. To this varnish 12 pounds of sulphuric acid are to be now added, in small successive quantities, with powerful stirring for half an hour; at the end of which time, 3 pounds of finely-ground gum arabic are added; after which the stirring is repeated half an hour, for 14 days longer, when the liquid blacking is ready for use. In making the paste blacking, the patentees prescribe the above quantity of India-rubber oil, ivory black, molasses, and gum arabic—the latter being dissolved in only 12 pounds of vinegar. These ingredients are to be well mixed and then ground together in a mill, till they form a perfectly smooth paste. To this paste 12 pounds of sulphuric acid are to be added in small quantities at a time, with powerful stirring, which is to be continued half an hour after the last portion of the acid has been introduced. Ready for use in seven days.

FOR MOROCCO SHOES.—Pound some black sealing wax, and put in a bottle with half a pint of alcohol; shake it frequently, and when it is dissolved, you may rub it on Morocco shoes when they are scaled or defaced, and they will look almost like new; dry it on in the sun.

GERMAN Blacking.—Ivory-black, 1 part; molasses, $\frac{1}{2}$ part; sweet oil, $\frac{1}{2}$ part; mix, as before; then stir in a mixture of hydrochloric acid, $\frac{1}{4}$ part; oil of vitriol, $\frac{1}{4}$ part each separately diluted with twice its weight of water before mixing them. This forms the ordinary paste blacking of Germany, according to Liebig.

GRAIN-SIDE Blacking.—Take a barrel and put into it quite a quantity of old iron, cast or wrought, then fill nearly full of soft water, and add 1 pt. of oil of vitriol; stir it up well, and in a month or two you have just as good blacking for the grain-side, as could be made by using vinegar in place of water.

HARNESS Blacking.—1. Good glue or gelatine, 4 oz.; gum arabic, 3 oz.; water, $\frac{3}{4}$ pint; dissolve by heat; add of molasses, 5 oz.; ivory-black in very fine powder, 5 oz.; and gently evaporate, with constant trituration, until of a proper consistence when cold; when nearly cold put it in bottles, and cork them down. For use, the bottle may be warmed a little to thin it, it necessary. Does not resist the wet.—2. Mutton suet, 2 oz.; bees'-wax pure, 6 oz.; soft soap, 2 oz.; lamp-black, $2\frac{1}{2}$ oz.; indigo (in fine powder) $\frac{1}{2}$ oz.; when thoroughly incorporated, further add of oil of turpentine $\frac{1}{2}$ pint; and pour it into pots or tins. Waterproof.—3. Bees'-wax, 1 lb.;

soft soap, 6 oz.; ivory-black $\frac{3}{4}$ lb.; Prussian blue, 1 oz.; ground in linseed oil, 2 oz.; oil of turpentine, $\frac{1}{2}$ pint; to be mixed, etc., as before. Waterproof.—4. (*English Water Proof.*) Take 3 ounces turpentine, 2 ounces white wax, to be dissolved together over a slow fire; then add 1 ounce of ivory-black and 1 dram of indigo, to be well pulverized and mixed together. When the wax and the turpentine are dissolved, add the ivory-black and the indigo, and stir till cold. Apply very thin; brush afterward, and it will give a beautiful polish.—5. A good blacking is made of 4 ounces of hog's lard, 16 ounces of neat's-foot oil, 4 ounces of yellow wax, 20 ounces of ivory black, 16 ounces of brown sugar, and 16 ounces of water. Heat the whole to boiling, and stir it until it becomes cool enough to handle, then roll it into balls about two inches in diameter.—6. A cheap and good blacking can be made as follows: Soften two pounds of glue in one pint of water, dissolve two pounds of soap (castile is the best, but most expensive) in one part of warm water; after the glue has become thoroughly soaked, cook it in a glue-kettle, and then turn it into a large pot; place the pot over a hot fire and pour in the soap-water, slowly stirring until all is well mixed; then add a half-pound of yellow wax cut in slices. Let the mass boil until the wax becomes melted, then add half a pint of neat's-foot oil and a sufficient quantity of lampblack to give it color; let it boil a few minutes, and it will be fit for use.—7. When a harness has become soiled, it can be restored by the use of the *French polish*. The ingredients are $4\frac{1}{2}$ pounds stearine, $6\frac{3}{4}$ pounds turpentine, and 3 ounces of coloring or ivory black. Beat the stearine out to thin sheets with a mallet, then mix it with the turpentine, and subject it to a water bath. While heating, it must be stirred continually; the coloring matter is thrown in after the mass has become thoroughly heated. It is thrown into another pot and stirred until it is cool and thick; if not stirred, the mass will crystallize and the parts become separated. When used, it must be warmed, and a small quantity rubbed on the leather with a cloth; use but little at a time and put on very thin. After it has partially dried, rub with a silk cloth, and a polish will be produced equal to that of newly varnished leather. This polish is also good for carriage-tops, straps, etc., and will in no way injure the leather.

INDIA RUBBER LIQUID, Blacking.—Take of India rubber (in small pieces), 18 oz.; hot rape oil, 9 lb. (say 1 gal.); dissolve; to the solution add of ivory black (in very fine powder), 60 lb.; molasses 45 lb.; mix thoroughly; further add of gum-arabic, 1 lb., dissolved in vinegar (No. 24), 20 gal.; reduce the whole to a perfect state of smoothness and admixture by trituration in a paint mill; throw the compound into a wooden vessel, and add, very gradually, of sulphuric acid, 12 lb.; continue the stirring for $\frac{1}{2}$ hour, repeating it daily for 14 days; then add of gum-arabic (in fine powder), 3 lb.; again mix well, and repeat the stirring for $\frac{1}{2}$ an hour daily for 14 days longer, when the liquid blacking will be ready for use, or for bottling. The quality is very excellent; but this, probably, does not depend on the presence of India rubber, but on the general correctness of the proportions, and the care and completeness with which they are mixed.

INDIA RUBBER PASTE, Blacking.—Of India rubber, oil, ivory-black, molasses, and gum-arabic, the same as for their liquid blacking (see above), but dissolving the last in only 12 pounds, say 5 quarts, instead of 20 gals. of vinegar; grinding to a smooth paste in a color-mill, and then adding of oil of vitriol, 12 lbs., as before. The mass is to be stirred daily for a week, when it will be fit for use, or potting.

LEATHER SEATS, Blacking for.—Beat well the yolks of two eggs and the white of one; mix a table-spoonful of gin and a tea-spoonful of sugar, thicken it with ivory-black, add it to the eggs, and use as common blacking; the seats or cushions being left a day or two to harden. This is good for dress boots and shoes.

LIQUID BLACKING.—1. Take of bone-black (commercial ivory-black) 16 parts; molasses, 12 parts; oil of vitriol, 3 parts; sperm oil, 2 parts; gum-arabic, 1 part; strong vinegar, or sour beer, 48 to 50 parts; (all by weight;) place the 'bone-black' in a capacious wooden, stone-ware, or enameled iron vessel, (avoid vessels of metal only), add the oil, and rub them well together; next gradually add the molasses, and actively and patiently grind or rub the mass, after each addition, until the oil is perfectly killed, and finally for some time afterward, to insure complete admixture; then cautiously dilute the vitriol with about three times its bulk of water, and add it in separate portions, to the former mixture, observing to stir the whole together, as rapidly as possible, on each addition of the acid, and for some minutes after the whole is added, so as to render the mass thoroughly smooth and homogeneous; let it stand, covered over, for two or three days, or longer, stirring it, in the mean time, for 15 or 20 minutes daily; lastly, having dissolved the gum in the vinegar, add the solution gradually to the rest, and stir the whole together briskly for some time, and again daily for 3 or 4 days. It may be further diluted, at will, with a little more vinegar or beer, or with water; but unnecessary or excessive dilution should be avoided, as the richness and quality of the blacking becomes proportionately reduced. If all the ingredients (except the vitriol) be made hot before admixture, the shining quality of the product will be greatly improved, and the process may be shortened.—2. Ivory-black, 16 parts; molasses, 8 parts; oil of vitriol, 4 parts; (diluted with) water, 2 parts; oil, 2 parts; gum-arabic, 1 part; soft water (for the final dilution, instead of vinegar), 64 parts; mixed, etc., as before. Excellent.—3. As the last; but taking only 6 parts of molasses, 1 part of oil, and omitting the gum-arabic. Good. A commoner article of liquid blacking does not sell.—4. (Without vitriol.) Take of ivory black (in very fine powder), 2 lb.; molasses, 1½ lb.; sperm oil, ¼ pint; mix as before; then add of gum-arabic, 1 oz.; (dissolved in) strong vinegar, ¼ pint; mix well; the next day further add of good vinegar, or strong sour beer, 3 to 4 pints; stir briskly for a ¼ of an hour, and again once a day for a week. Excellent. A cheaper, but inferior article, may be made by the reductions and omissions noticed above.—5. From paste blacking (see below), by reducing it with sufficient vinegar, sour beer or water to give it the liquid form.

PASTE BLACKING.—1. Qualities from good to superexcellent may be made from any of the preceding formulas, by simply omitting

the final dilution with the vinegar, sour beer, or water, therein ordered at the end of the process.

—2. Ivory-black, 1 cwt.; molasses, 28 lb.; rape oil or other cheap oil, 1 gal.; mix as before; then add of oil of vitriol, 21 lb.; diluted with water, 2 gal.; mix them quickly and thoroughly by forcible stirring with a strong wooden spatula, and as soon as admixture is complete, but while still fuming, put the cover on the tub and leave it till the next day, when without further stirring it will be fit for use or sale. Good ordinary. Used for tins.—3. As the last; but adding, with the ivory-black, etc., 14 to 28 lb. of coal-soot sifted, omitting one half of the oil, and diluting the vitriol with an extra gallon of water. Inferior. Chiefly used for low price packages.—4. Ivory-black, "killed" with a table-spoonful alcohol, ¼ pound; sweet oil, 1 fluid ounce; molasses, ½ pint; hydrochloric acid, 1 ounce; sulphuric acid, 1 ounce; mix the first three ingredients, add the acids, and 3 pints of vinegar if it is to be liquid blacking. No "challenge blacking" equals this.

VARNISH Blacking.—1. Take 98 per cent alcohol, 1 gal.; white pine turpentine, 1½ lbs.; gum shellac, 1½ lbs.; Venice turpentine, 1 gill. Let these stand in a jug in the sun or by a stove until the gums are dissolved, then add sweet oil 1 gill, and lamp-black, 2 ozs., rub the lamp-black first with a little of the varnish.—2. Alcohol, 1 gallon, white turpentine, 1½ lbs., gum shellac, 1½ lbs., Venice turpentine, 1 gill. Let these stand in a jug in the sun, or by a stove, until the gums are dissolved, then add sweet oil, 1 gill, and lampblack, 2 oz., and you have a varnish which will not crack when the harness is twisted like the old shellac varnish.

VARNISH, for Edge.—Take 98 per cent alcohol, 1 pt.; shellac 3 ozs.; rosin, 2 ozs.; pine turpentine, 1 oz.; lamp-black, ¼ oz.; mix, and when the gums are all cut, it is ready to use; but bear in mind that low proof alcohol will not cut gums properly, for any varnish.

WATER PROOF Blacking.—Take an old pair of India rubber shoes, (boots or any old India rubber,) cut them up and pull off the clothing; put the rubber into about a pint of neat's foot oil, and set it on the stove until the rubber is entirely melted, stirring it once in a while. Don't let it boil or burn. It will take about two days to melt the rubber. As soon as the rubber is melted, stir in one and a half pounds of beef or mutton tallow, and one-half pound of bees-wax. If it is not black enough, you may add a little lamp-black. To apply to the boots: Wash them clean of mud and blacking. When they are nearly dry, apply the water-proof all over them. If the weather is cold, work near the stove. The best thing to use in applying this blacking is one's hands, and considerable elbow-grease to rub it well into the leather. Two days after it is applied to leather, the leather will receive a polish from ordinary blacking which will resist both fresh and salt water.

INKS.

ASIATIC.—Logwood shavings and powdered galls, of each 2 lbs.; green vitriol 1 lb., gum ½ lb.; pomegranate bark ¼ lb.; water 1 gallon; infuse 14 days, with frequent agitation.

AUTOGRAPHIC, for Lithographers.—White soap, 25 parts; white wax, 25 parts; mutton suet, 6 parts; lamp-black, 6 parts; shell

lac, 10 parts; mastic, 10 parts. Mix with heat, and proceed as for lithographic ink.

BLUE.—1. Take soft Prussian blue and oxalic acid in equal parts, powder them finely, and then add soft water to bring it to a thin paste. Let it stand for a few days, then add soft water to make the desired shade of color, adding a little gum arabic to prevent its spreading.

2.—Chinese blue, 3 ounces, oxalic acid (pure), $\frac{3}{4}$ of an ounce; gum arabic, powdered; 1 ounce, distilled water; 6 pints. Mix.

BLUE, Indelible.—This ink, for marking clothing, is made of five parts of oxide of molybdenum dissolved in the requisite quantity of hydrochloric acid; two parts of the extract of liquorice, and six of gum arabic dissolved in 200 parts of water. These two solutions are mixed, and after writing with them on the objects, the side written upon is moistened with a solution of chloride of tin in water. This indelible ink not only withstands washing, but also all kinds of soaps and alkalies, except those which also destroy the linen.

BLUE BLACK.—Bruised galls, 1 lb., water, 6 quarts; steep for ten days, add iron filings, 1 oz., sulphuric acid, 1 oz., copperas, 3 oz.; stir frequently, and in a few days strain the liquor. Powder 1 oz. of indigo very finely, dry it by a strong heat, and stir it into 4 oz. of the strongest sulphuric acid; reduce the product by heat to the consistence of syrup. After twenty-four hours add 1 pint of water, and mix with the ink. The free acid must now be neutralized with chalk or whiting. A little of this ink, properly prepared, should color a pint of clear water throughout immediately.

BRANDES.—Galls, 6 oz., water, 6 pints; boil, and add 4 oz. each of gum and copperas; bottle, and add to each pint, 1 grain of bi-chloride of mercury, or 4 drops of creosote.

BROME'S.—Galls, 10 lbs., logwood, 4 lbs., copperas, 4 lbs., brown sugar, 1 lb., water, $13\frac{1}{2}$ gallons, gum, 4 lbs. Boil the galls, logwood, and gum separately, mix the liquors, add the copperas; and make up $13\frac{1}{2}$ gallons.

BROWN.—Digest powdered catechu, 4 parts, with water, 60 parts, for some hours; filter, and add sufficient of a solution of bichromate of potassa, 1 part in 16 of water.

CARBON.—Mix good Indian-ink with common writing-ink. A useful ink for ticket and shop-window labels.

CARMINE.—Boil 1 pound 4 ounces of ground cochineal, and a very little of the carbonate of soda in 4 gallons of soft water for 20 minutes; then take it from the fire, and add 6 drachms of alum, and stir the mixture for a few minutes, and let it stand for a quarter of an hour for the dregs to subside; then run off the clear liquor; strain the sediment through a fine sieve or cloth, and then, when cold, add the white of two eggs with the sediment; fish glue or isinglass will answer as well as the eggs. The muriate of tin may be used instead of alum. The weight of the cochineal may be reduced to any amount to make a small quantity if the proportions are preserved.

CHINESE INK. See "India Ink."

COPPER-PLATE, Printers-Ink.—Ink for the rolling-press is made of linseed-oil, burnt just as for common printing-ink, and is then mixed with Frankfort black, finely ground. There are no certain proportions, every workman

adding oil or black to suit. Good ink depends most on the purity of the oil, and on its being thoroughly burned. Test it occasionally by cooling a drop on the inside of an oyster-shell; feel it between the thumb and finger, and if it draws out into threads, it is burnt enough. Weak oil well charged with black is called stiff ink. Oil fully burned and charged with as much black as it will take in, is termed strong ink. The character of the engraving to be printed determines which is suitable.

COPYING.—1. Take two gallons of rain water, and put into it $\frac{1}{4}$ pound of gum arabic, $\frac{1}{4}$ pound brown sugar, $\frac{1}{4}$ pound clean copperas, $\frac{1}{4}$ pound powdered nut galls. Mix, and shake occasionally for ten days, and strain. If needed sooner, let it steep in an iron kettle until the strength is obtained.—2. Take 2 gallons rain water, and put into it gum arabic, $\frac{1}{4}$ lb.; brown sugar, $\frac{1}{4}$ lb.; clean copperas, $\frac{1}{4}$ lb.; powdered nutgalls, $\frac{1}{4}$ lb.; mix, and shake occasionally for ten days, and strain; if needed sooner, let it stand in an iron kettle until the strength is obtained. This ink will stand the action of the atmosphere for centuries, if required.

COPYING, Requiring no Press.—A black copying ink, which flows easily from the pen, and will enable any one to obtain very sharp copies without the aid of a press, can be prepared in the following manner: One ounce of coarsely broken extract of logwood and two drachms of crystalized carbonate of soda are placed in a porcelain capsule with eight ounces of distilled water, and heated until the solution is of a deep red color, and all the extract is dissolved. The capsule is then taken from the fire. Stir well into the mixture one ounce of glycerine of specific gravity of 1.25, fifteen grains of neutral chromate of potash, dissolved in a little water, and two drachms of finely pulverized gum arabic, which may be previously dissolved in a little hot water so as to produce a mucilaginous solution. The ink is now complete and ready for use. In well closed bottles it may be kept for a long time without getting moldy, and, however, old it may be, will allow copies of writing to be taken without the aid of a press. It does not attack steel pens. This ink cannot be used with a copying press. Its impression is taken on thin moistened copying paper, at the back of which is placed a sheet of writing paper.

DRAWING.—A very black and indelible drawing ink can be made by dissolving shellac in a hot aqua solution of borax, and rubbing up in this solution a fine quality of Indian ink. After using, dip the drawing pen in alcohol, and wipe dry to keep it clean and bright.

ELDERBERRY.—The bruised berries are placed in an earthen vessel, and kept in a warm place for three days, then pressed out and filtered. The filtered juice is of such an intense dark color that it takes 200 parts of water to reduce it to the shade of dark red wine. Add to $12\frac{1}{2}$ quarts of this filtered juice 1 oz. of sulphate of iron, and the same quantity of crude pyroligneous acid; and an ink is prepared which, when first used, has a violet color, but when dry is indigo-blue black. This ink is said by a German chemist to be superior in many respects to that prepared with galls; it does not become thick so soon, it flows easier from the pen without gumming, and in writing the letters do not run into one another.

EXCHEQUER.—Bruised gall, 4 parts; gum

arabic, powdered, 1 part; green vitriol nine-tenth of a part; rain water, or the water of melted ice, 45 parts; mix and let stand; shake once a day. Fit for use in three weeks.

FADED INK, To Restore.—Writing rendered illegible by age may be restored by moistening it by means of a feather with an infusion of galls, or a solution of prussiate of potash slightly acidulated with muriatic acid, observing so to apply the liquid as to prevent the ink spreading.

FLUIDS, WRITING.—What are called writing fluids, in distinction from ink, are fluids which flow freely from the pen and do not clog—have a good color when written, but do not necessarily retain that color after the lapse of a few months. Ink, distinguished from writing fluids, retains its colors, if rightly made, for centuries; and it is evidently necessary that it should do so, for, on account of its use in legal documents, the most important interests of society are dependent upon that very quality.

The best writing fluids are made either from logwood extract or a decoction of logwood, with the aid of a bichromate of potash in the former case, and the chromate (yellow) in the latter—or from some of the many forms of Prussian blue.

1. Dissolve ordinary soluble Prussian blue in clean soft water until the desired shade is obtained. This gives a good color, and is not affected by alcohol; but any salt added to the water will throw down the color. Should this happen, throw away the salty water and redissolve the Prussian blue in fresh soft water. Gradual exposure to the air on or near the seacoast, and the constant use of a steel pen, will therefore cause this ink to have a sediment; but notwithstanding that, when frequently made, or kept from the air as much as possible, it is quite good.—2. Soluble ferro-cyanide of potassium and iron dissolved in water, as in No. 1. Alcohol throws down the coloring matter in this solution as well as salt.—3. Powdered Prussian blue, one ounce; muriatic (hydrochloric) acid, concentrated, one and a half fluid ounces. Mix in a bottle; after thirty hours, dilute with water to the required shade.—4. (*Lewis's Black Writing-Fluid.*) One part powdered copperas, 1 part logwood, 3 parts crushed gall-nuts, 1 part gum-arabic, 100 parts white wine or vinegar.—5. (*Reban Cort's Writing-Fluid.*) Boil 8 parts powdered Aleppo gall-nuts, and 4 parts thin shavings of logwood, for one hour, in 200 parts of water until reduced to 100 parts. Filter and add 4 parts copperas, 3 parts gum arabic, 1 part blue vitriol, (cupric sulphate,) and 1 part white sugar; let the mixture stand one day and preserve in closed bottles. In these six prescriptions, of German, English, and French origin, copperas or sulphate of iron is the chief ingredient. Lately, however, a substitute has been found in the chromate compound, which is the chief ingredient in the following prescription: 6. (*Runge's Writing-Fluid for Steel Pens.*) consists of 1000 parts of extract of logwood, made by boiling down 155 parts of logwood in 2000 parts of water; filter and add 1 part of yellow chromate of potash. This ink is of a very bluish tint when first used; but unlike those made from iron, it leaves no deposit when exposed to the air. To prevent mould, add a few drops of a solution of bi-chloride of mercury.

FLUID, BLUE WRITING.—1. Ferrocyanide of iron, powdered, and strong hydrochloric acid, each 2 parts. Dissolve, and dilute with

soft water.—2. (*Indestructible.*) Shellac, 4 parts; borax, 2 parts; soft water, 36 parts. Boil in a close vessel till dissolved; then filter, and take of gum arabic, 2 parts; soft water, 4 parts. Dissolve and mix the two solutions together, and boil for five minutes as before, occasionally stirring to promote their union; when cold, add a sufficient quantity of finely-powdered indigo and lamp-black to color; lastly, let it stand for two or three hours, until the coarser powder has subsided, and bottle for use. Use this fluid with a clean pen, and keep it in glass or earthen ink-stands, as many substances will decompose it while in the liquid state. When dry, it will resist the action of water, oil, turpentine, alcohol, diluted sulphuric acid, diluted hydrochloric acid, oxalic acid, chlorine, and the caustic alkalies and alkaline earths.

GEIZZLER'S BLACK.—1 lb. crushed gall-nuts; 10 ozs. copperas; 3 ozs. gum-arabic; 1 qt. vinegar, and 7 qts. water. Let the mixture stand for two weeks, and pour off the liquid, which is the ink. The residuum at the bottom will be the gall-nuts with some ink adhering, and may be used again by adding 3 ozs. copperas, 1 oz. gum-arabic, and a corresponding quantity of water and vinegar—keeping the preparation in a warm place.

GREEN.—1. Digest 1 part of gamboge with from 7 to 10 parts of the blue ink.—2. To powdered bichromate of potassa, 8 parts, contained in a porcelain dish, add oil of vitriol, 8 parts, previously diluted with 64 of water; then heat, while evaporating, add gradually 24 parts of alcohol, and reduce to 56 parts, which filter, and in the clear liquor dissolve 8 parts of gum arabic.

GREGORY'S (Having a greenish tint.)—Bruised galls, 1 pound; logwood, $\frac{1}{2}$ pound; gum 6 ounces; copperas, 8 ounces; blue vitriol, 1 ounce; sugar, 1 ounce. Boil the galls and logwood in twenty pints of water down to ten pints, strain, dissolve the other ingredients, and bottle.

GOLD.—Genuine gold leaf is rubbed on a glass or agate plate with honey, by means of a muller, until a perfectly uniform mixture is obtained; this is washed in a glass or other suitable vessel, and the honey removed by frequent washing with pure water. The resulting gold powder is dried, and when used is suspended in a solution of gum arabic. After writing with this ink, the letters are to be burnished with a smooth piece of ivory, to produce their golden color and brightness.

HAENLE'S Black.—This ink, it is claimed, does not attack steel pens. Two parts crushed gall-nuts, 1 part gum-arabic, 1 part copperas, and 16 parts distilled or rain-water, adding a few grains of mercurial sublimate to prevent mould. In prescription No. 1, the latter is avoided by using vinegar.

INCORRODIBLE Black.—1. A black ink, not corroding steel pens, and neutral, may be prepared by digesting in an open vessel 42 ounces coarsely powdered nutgall, 15 ounces of gum senegal, 18 ounces of sulphate of iron, free from copper, 3 drachms of aqua ammonia, 24 ounces of alcohol, and 18 quarts of distilled or rain water. Continue the digestion until the fluid has assumed a deep black color.—2. Boil $1\frac{1}{2}$ ozs. of well-picked logwood in little more than a quart of water, down to a pint; let it cool; then add 17 or 18 grains of chromate of potash, and stir it briskly. The ink is then ready for use. It re-

sists the action of all ordinary destructive agents better than the old ink. It may be washed, after use, with a wet sponge, or steeped for 24 hours in water, or even tested with dilute acids, and yet preserve its original blackness. As it contains neither gum nor acid, and is a perfect liquid, it neither thickens, deposits a sediment, nor corrodes the steel of the pen.

INDESTRUCTIBLE.—On many occasions, it is of importance to employ an ink indestructible by any process, that will not equally destroy the material on which it is applied. For black ink, 25 grains of copal, in powder, are to be dissolved in 200 grains of oil of lavender by the assistance of a gentle heat, and are then to be mixed with $2\frac{1}{2}$ grains of lampblack, and half a grain of indigo. This ink is particularly useful for labeling phials, etc., containing chemical substances of a corrosive nature.

INDELIBLE.—1. To 4 drachms of lunar caustic, in 4 ounces of water, add 60 drops of nut-galls, made strong by being pulverized and steeped in soft water. The mordant which is to be applied to the cloth before writing, is composed of 1 ounce of pearlsh dissolved in 4 ounces of water, with a little gum arabic dissolved in it. Wet the spot with this; dry and iron the cloth; then write.—2. $1\frac{1}{2}$ drachms of nitrate of silver, 1 ounce of distilled water, $\frac{1}{2}$ ounce of strong mucilage of gum arabic, $\frac{1}{4}$ of a drachm of liquid ammonia. Mix the above in a clean glass bottle, cork tightly, and keep in a dark place till dissolved, and ever afterwards. Directions for use: Shake the bottle, then dip a clean quill pen in the ink, and write or draw what you require on the article; immediately hold it close to the fire (without scorching), or pass a hot iron over it, and it will become a deep black.

INDELIBLE, Aniline.—The discovery of an aniline black has led to the employment of this coloring matter in marking linen. This ink has the advantage of being cheaper than the ink prepared from nitrate of silver. It has also another advantage over the latter salt, viz.: that it is chemically indelible. The ink made with nitrate of silver can be removed by washing the linen with a solution of hyposulphite of soda, or by moistening it with a solution of bichloride of copper and then washing with liquid ammonia. This is not the case with the aniline ink, the color of which cannot be removed by any chemical agent whatever. Linen therefore marked with this ink can never be appropriated by other persons than the right owner.

1. Such aniline ink may be prepared in the following way: $8\frac{1}{2}$ grains of bichloride of copper are dissolved in 30 grains of distilled water, then are added 10 grains of common salt, and $9\frac{1}{2}$ grains of liquid ammonia. A solution of 30 grains of hydrochlorate of aniline in 20 grains of distilled water is then added to 20 grains of a solution of gum arabic, containing 2 pints water, 1 pint gum arabic, and lastly 10 grains of glycerine 4 parts of the aniline solution thus prepared are mixed with one part of the copper solution.

The liquid which results has a green appearance, and may be at once employed for marking linen, since it invariably becomes black after a few days. A steel pen may be employed as well as a quill. If it is desirable not to wait so long for the appearance of the black color, a hot iron may be passed over the writing when the ink is dry, or the linen may be held over the

flame of a spirit lamp, or over a hot plate, or hot water, when the black tint will readily appear.

2. (*Puscher's.*) Dissolve 4 parts of aniline black in 16 parts by weight of alcohol, with 60 drops strong hydrochloric acid, and dilute the dark blue solution with 90 parts by weight of water, in which 6 parts of gum arabic has been previously dissolved.

INDELIBLE, To be used with Type.—The thin nitrate of silver marking inks may be thickened with gum or sugar or with printer's ink to bring them to the proper consistency. Inks for using with types or stencil plates are sometimes prepared by taking sulphate of manganese, two parts; lampblack, one part; sugar, four parts; all in fine powder and triturated to a paste with a little water. Or black oxide of manganese and hydrate of potassa are mixed, heated to redness in a crucible, and then triturated with an equal weight of pure white clay, and water enough to give consistency. The work to be rinsed well in water after it has become dry.

INDIA INK.—Take 8 parts well-burnt lamp-black, 64 parts water, 4 parts fine pulverized indigo, well rubbed up and boiled till the greater portion of the water is evaporated; then add 5 parts gum-arabic, 2 parts bone-glue, 1 part extract of succory; boil till the mixture is as thick as paste, then mould in wooden forms, well greased with olive or almond-oil, in order to prevent adhesion. By using burnt peach kernels or cork, in place of ordinary lamp-black, a finer quality may be given to the ink. The glue would better be left out, and gum-arabic substituted. The mass is then pressed into flat cakes weighing from one to two pounds, and left to ripen for a couple of days, after which it is formed into the customary shape. The moulder takes for this purpose a piece of the dough, and warms it by means of a basin full of live coals, kneads it long enough in his hands and then fills the form, which he puts under a long lever, pressing it by his own weight, while in the meantime he works the next piece of the mass. The moulds are made of wood, and also the pistons on which are cut the letters. The lustre is produced by brushing the dried ink with a hard brush saturated with rosin, which also prevents the ink from blackening the fingers afterwards. The peculiar odor is derived from a small quantity of camphor or musk, which is incorporated with the warm dough. All ordinary inks are without it. The colored letters are painted on with a fine brush; the gold and silver colors by suspending the finely divided metals in water to which has been added a little gelatine.

INDIA INK, How to Select.—Indian ink for drawings is best tested in the following manner: Rub off a portion on a porcelain surface with water to the proper consistency, then with a ruler draw a number of lines of varying thickness on a piece of drawing-paper. When dry, brush over with water freely. If good the ink lines will keep sharp and clear, whilst poor ink will run or spread sideways. A piece of slate is better than glass for rubbing it down to the condition fit for use.

INDIA INK, For Ordinary Writing.—India ink is composed of carbon, and will keep for any length of time without undergoing change, although dissolved in water. Neither great heat nor extreme cold affects it. All that is requisite is to keep the liquid from evaporating—so far as that is possible,—and to protect it from dust.

The solution makes an excellent ink, and is of a fine black.

INDIA INK, Substitute for.—Boil parchment slips or cuttings of glove-leather in water till it forms a size, which, when cool, becomes of the consistence of jelly; then, having blackened an earthen plate, by holding it over the flame of a candle, mix up, with a camel-hair pencil, the fine lampblack thus obtained with some of the above size, while the plate is still warm. This black requires no grinding, and produces an ink of the same color, which works as freely with the pencil, and is as perfectly transparent as the best Indian-ink.

FAHN'S Black.—Two parts ground logwood, 12 parts Bablah, (an oriental gum containing tannin, and derived from acacias,) 200 parts water. Boil down to 100 parts, filter through linen, and add 1 part powdered gum-arabic, 1 part sugar, and 3 parts copperas. To prevent mould, add a solution of 1-100 part of mercurial sublimate in 1 part water.

JAPAN Black.—In 6 quarts of water boil 4 ounces of logwood in chips cut very thin across the grain. The boiling may be continued for nearly an hour, adding from time to time, a little boiling water to compensate for waste by evaporation. Strain the liquor while hot; allow it to cool, and make up the quantity equal to five quarts by the further addition of cold water. To this decoction put one pound of blue galls coarsely bruised, or $\frac{1}{4}$ pound of the best galls in sorts, 4 ounces of sulphate of iron calcined to whiteness, $\frac{1}{2}$ ounce of acetate of copper, previously mixed with the decoction till it forms a smooth paste, 3 ounces of coarse sugar, and 6 ounces of gum senegal or arabic. These several ingredients may be introduced one after another, contrary to the advice of some, who recommend the gum, etc., to be added when the ink is nearly made. The composition produces the ink usually called Japan ink, from the high gloss which it exhibits when written with.

LEWIS.—Bruised galls, 3 lbs., gum and copperas, of each 1 lb., vinegar, 1 gallon, water, 2 gallons; macerate, with frequent shaking, for 14 days. Product 3 gallons.

LITHOGRAPHIC.—1. Take Venice turpentine, 1 part; lampblack, 2 parts; tallow, 6 parts; hard tallow soap, 6 parts; mastic in tears, 8 parts; shell lac, 12 parts; wax, 16 parts. Melt and pour it out on a slab. 2. Take dry tallow soap, 5 parts; mastic in tears, 5 parts; Scotch soda, 5 parts; shell lac, 25 parts; lampblack, 2 parts. Fuse the soap and lac, then add the remainder.

For use this ink must be rubbed down with water, in a saucer (warmed), until an emulsion is formed of a proper consistence to flow easily from a pen or pencil.

LUMINOUS Ink.—Phosphorus, half drachm; oil cinnamon, half ounce; mix in vial, cork tightly, heat it slowly until mixed. A letter written with this ink can only be read in a dark room, when the writing will have the appearance of fire.

MARKING Ink, See "Indelible".

MARKING Ink, To Take out.—Most indelible ink contains silver as a basis, and may be removed by a solution of cyanide of potassium. When the basis of the ink is carbon, however, this will fail. Chlorine will destroy stains and markings dependent upon organic matters except the carbon ink.

MARKING Ink for Parcels.—Dissolve as-

phaltum, grahamite, albertite, or any mineral of this character in naphtha or oil of turpentine to a thin fluid, and you will obtain an ink to answer all purposes, viz., to dry quickly, not to spread, and the markings to be nearly indestructible.

METALS, Inks for Writing on.—1. Mix 1 oz. of powdered sulphate of copper and $\frac{1}{2}$ oz. of powdered sal ammoniac, with 2 oz. of diluted acetic acid; adding lampblack or vermilion.—2. Dissolve 1 part of copper in 10 of nitric acid, and dilute with 10 parts of water. The above two receipts will answer for writing on steel, or tinplate or sheet zinc.—3. Verdigris, one ounce; sal ammoniac, 1 ounce; lampblack, half an ounce; water, half a pint. Mix in an earthenware mortar, without using a metal spatula. To be shaken before use, and used with a clean quill pen on bright, freshly-cleaned zinc.

MOULD in Ink, To Prevent.—The microscope has revealed the fact that mould is a plant, propagated like other plants; and any thing that will kill vegetation will prevent ink or any other mould. The common remedies applied for this purpose are, creosote, carbolic acid, oil of cloves, bergamot, or many other ethereal oils, acetic acid, alcohol, corrosive sublimate, arsenic, etc.; but always added in comparatively small quantities.

OILINESS in Ink, To Remove.—Add a little ox-gall and vinegar to the ink.

PERMANENT Ink, For Use with Stamps or Type.—1. Equal parts of black oxide of manganese and hydrate of potash are mixed, heated to redness, rubbed, with an equal quantity of smooth white clay, into a paste, water being added for the purpose.—2. Sulphate of manganese, 2 drams; lampblack, 1 dram; powdered loaf sugar, 4 drams; rubbed into paste with water. After stamping, dry the linen, etc., and wash well in water.

PERPETUAL Ink, For Tombstones etc.—Pitch, 11 lbs.; lampblack, 1 lb.; turpentine sufficient: mix with heat.

PREROGATIVE Court Ink.—Galls, 1 lb., gum, 6 oz., alum, 2 oz., copperas, 7 oz., kino, 3 oz., logwood, 4 oz., water, 8 lbs. Used to write on parchment.

PRINTING INK.—Set on a fire, in a large iron pot, 12 gallons of clear linseed oil, boil, and stir until it smokes, then ignite it, remove it from the fire, and let it burn until a sample will draw into strings between the fingers. Put the lid on to extinguish the flame, then add 1 lb. of resin to each quart of oil; dissolve, and add gradually in slices $1\frac{1}{4}$ lb. of soap; heat the pot until the solution is complete, when the varnish is ready.

—Two sorts are kept, one thick, and the other thin, so as to mix when required; the difference is caused in the boiling and firing being kept up for different periods. For large printing-type a thin is required, as thick ink would only print in patches; for small type very stiff ink is used, to prevent it running off. For making black ink, mix together mineral lamp-black, 8 lbs., vegetable black, 7 lbs., indigo and Prussian blue, of each 5 oz., Indian red, 2 oz.; grind this with sufficient varnish, gradually added as the grinding goes on. In most manufactories steam is employed for this purpose. For colored ink use colored pigments, according to the required shade.

PRINTING, SAVAGE'S.—Take of balsam of copaiba (pure), 9 oz.; lampblack, 3 oz.; indigo

and Prussian blue, of each $\frac{1}{2}$ oz.; Indian red, $\frac{3}{4}$ oz.; yellow soap (dry), 3 oz.; grind the mixture to an impalpable smoothness by means of a stone and muller. Canada balsam may be substituted for balsam of copaiba where the smell of the latter is objectionable, but the ink dries very quickly.

PRINTING, KIRCHER'S, (Patented.)—This ink consists of 10 parts of hydrated peroxide of iron, 6 parts of hydrated protoxide of iron, and from 10 to 16 parts of varnish. The two first-named ingredients are mixed in a moist state by stirring; 48 parts of water are then added; and the water being evaporated by boiling converts the mixture into a fine velvety black powder. This powder is washed and dried, and finally mixed with the varnish, the proportion of which varies in accordance with the desired quality of the ink.

The advantages claimed for this ink are that it never changes its color. It has no disagreeable odor; it is a fine glossy black; and is one third cheaper than ordinary ink.

POWDER, INK.—1. Sulphate of copper, 1 dr.; gum arabic $\frac{1}{4}$ oz.; copperas, 1 oz.; nutgalls and extract of logwood, 4 ozs. each; all to be pulverized and evenly mixed.—2. Sulphate of iron, 2 parts; galls, 5 parts; gum, 1 part. Reduce to a powder and divide into one-ounce papers, each of which will make half a pint of ink.—3. Aleppo galls, 3 lbs.; copperas (dry but not calcined), 1 lb.; gum arabic, 6 oz.; white sugar, 2 ozs.; all in powder; mix. 1 pint of boiling water poured on $1\frac{1}{2}$ or 2 ozs., makes a pint of ink.

POWDER, (INK) PLATZER'S.—Take 100 parts dry extract of logwood, well mixed and ground with one part fine bi-chromate of potash. Half an ounce is sufficient to change a whole pint of water into beautiful black ink.

PURPLE.—A beautiful purple ink is made by boiling 1 ounce of ground logwood in $1\frac{1}{2}$ pints of soft water, and $\frac{1}{2}$ ounce of pulverized alum. Boil 20 minutes, strain, and bottle for use. Keep the air out, and it will keep a long time.

RED.—1. Pernambuco-wood, 4 parts; alum and cream of tartar, each 1 part, with 30 of water; boil down to 16 parts, let stand, pour off, filter, and dissolve in the liquid gum arabic, $1\frac{1}{2}$ parts; white sugar, 1 part.

2. Digest powdered cochineal, 8 parts, and carbonate of potash, 16 parts, in 144 of water, for 24 hours; then boil up with powdered alum, 4 parts, and add 24 of cream of tartar, with 3 parts of tartaric acid, and, when effervescence has ceased, another part of the acid, or enough to produce the color; let cool, filter, and boil the residue on the filter with 12 parts of water; filter again, mix the liquids and dissolve in them 24 parts of gum arabic, and lastly $\frac{1}{2}$ part of oil of cloves. No iron vessels must be used in this process.

3. Digest powdered cochineal, 16 parts; oxalic acid, 2 parts; dilute acetic acid, 80 parts; distilled water, 40 parts, for 36 hours; then add powdered alum, 1 part; gum arabic, 1 to 10; shake up, let stand for 12 hours, and strain.

4. Dissolve 1 part of carmine in 8 to 10 parts of aqua ammonia, and add mucilage of gum arabic sufficient to reduce it properly.

RED, PERMANENT.—Vermilion, 4 parts; sulphate of iron, 1 part; drying oil to mix. Any other color will answer besides red. This ink will resist most of the usual reagents.

RESIN-OIL INK.—Melt together 13 ounces of resin, 1 pound of resin oil, and $1\frac{1}{2}$ ounces of soft soap; when cold, add lamp-black.

RIBAU COURT'S.—Galls, 1 lb., log-wood, $\frac{1}{2}$ lb., gum, 6 ozs., copperas, 8 ozs., blue vitriol and sugar, of each 1 oz. Boil the galls and logwood in 20 pints of water down to 10 pints—strain; dissolve the other ingredients, and bottle.

RULING, Black, for.—Take good black ink, and add gall as for blue; do not cork it, as it will prevent it from turning black.

RULING, Blue for.—Take 4 ounces of vitriol, best quality, to 1 ounce of indigo; pulverize the indigo very fine; put the indigo on the vitriol, let them stand exposed to the air for six days, or until dissolved; then fill the pot with chalk, add half a gill of fresh gall, boiling it before use.

RULING, Red for.—One pound of Brazilwood to one gallon of the best vinegar; let the vinegar simmer before you add the wood, then let them simmer together for half an hour, then add three-quarters of a pound of alum to set the color; strain it through a woollen or cotton cloth, cork it tight in a stone or glass bottle. For ruling, add half a gill of fresh gall to one quart of red ink, then cork it up in a bottle for use.

SCARLET.—Take garancine of best quality 1 ounce, digest with liquor ammonia 1 ounce, add 1 pint of cold distilled water, triturate together in a mortar, filter, and dissolve in the solution $\frac{1}{2}$ ounce of gum arabic, or take pure carmine 20 grains, liquor ammonia 3 fluid ounces, dissolve and add 18 grains of powdered gum.

SILVER.—Triturate in a mortar equal parts of silver foil and sulphate of potassa, until reduced to a fine powder; then wash out the salt, and mix the residue with a mucilage of equal parts of gum arabic and water.—2. Mix to a proper consistency finely ground mica, with a solution of gum arabic, in water.

SYMPATHETIC INKS, For secret and other

Correspondence.—Chemistry gives us the means of performing many curious feats. Among the most interesting of these are the perfectly colorless fluids, clear as water, which however, when written with, produce a variety of colored letters, by reason of simple chemical changes taking place as soon as the fluid touches the paper. We will describe a few of these transformations:—*To write blue letters with a colorless liquid.*—A piece of writing paper is prepared by moistening with a solution of oxalic acid, and drying; and a diluted (colorless) solution of nitrate of cobalt is used for writing. The oxalate of cobalt which results from the contact is blue. Or, the paper may be moistened with the nitrate of cobalt, and the writing done with the oxalic acid. Another shade of blue is produced by moistening the paper with a solution of yellow prussiate of potash. After drying it is ready for use; and when it is written on with a solution of chloride or sulphate of iron, letters of Prussian blue will appear. The paper may also be prepared with sulphate of iron and the writing performed with the prussiate of potash.—*To write red letters with a colorless liquid.*—Prepare the paper with a weak solution of sulphate of iron, to which a little nitric acid has been added; then write with a very dilute solution of sulpho-cyanide of potassium. If the solution is strong, the color is very dark; if weak, bright red.—*To write black letters with a colorless liquid.*—Prepare the paper with a decoction of gall-nuts or a solution of tannic acid, and write

with a solution of sulphate of iron; or, prepare with the latter and write with the former. Another black is obtained by preparing the paper with a weak solution of bichromate of potash, and writing with a solution of extract of logwood; or inversely. Or, prepare the paper with a solution of nitrate of bismuth or acetate of lead, and write with a fresh solution of sulphate of potassium.—*To write yellow letters with a colorless liquid.*—Prepare the paper with acetate of lead, and write with bichromate of potash; or inversely. Or, prepare the paper with a decoction of gall-nuts, and write with chloride of antimony; or inversely.—*To write orange letters with a colorless liquid.*—Prepare the paper with a solution of the yellow protochromate of potash, and write with the extractum Saturni of the druggists; or inversely.—*To write beautiful purple letters with a colorless liquid.*—Prepare the paper with a solution of chloride of tin, and write with a solution of chloride of gold.

If in any of the above manipulations the preparation of the paper is omitted, the letters written will be entirely invisible, or nearly so, and will become visible in their respective colors when moistened with the solution otherwise used for the preparation. In this manner, a secret correspondence is often kept up, one party, for instance, writing with a solution of yellow prussiate of potash, while another, for whom the writing is intended, knows the secret to moisten the paper with a solution of sulphate of iron, when the letters will appear in blue; or, one writing with chloride of gold, the other party moistening with a tin-salt, when the letters appear in purple.

Sometimes it is desirable that the writing may be made to disappear again. For this purpose, the writing is performed with a solution of nitrate of silver. After becoming dry, it is made visible by means of a solution of common salt, and exposure to the sun or daylight. When desired to disappear, it is washed with a solution of bichloride of mercury; and then it may be made to reappear a second time by moistening with a solution of hyposulphite of soda.

SYMPATHETIC Inks, Other.—1. Write upon paper with a diluted solution of muriate of copper, when dry it will not be visible, but on being warmed before the fire the writing will become of a beautiful yellow.

2. Write with a solution of muriate of cobalt, and the writing, while dry, will not be perceptible; but if held towards the fire, it will then gradually become visible; and if the muriate of cobalt be made in the usual way, the letters will appear of an elegant green color.

3. Write with acetate of cobalt, or with a muriate of cobalt, previously purified from the iron which it generally contains. When the writing is become dry, these letters will also be invisible. Warm the paper a little, and the writing will be restored to a beautiful blue.

4. Draw a landscape with Indian ink, and paint the foliage of the vegetables with muriate of cobalt, some of the flowers with acetate of cobalt, and others with muriate of copper. While this picture is cold it will appear to be merely an outline of a landscape, or winter scene; but when gently warmed, the trees and flowers will be displayed in their natural colors, which they will preserve only while they continue warm. This may be often repeated.

5. Write with dilute nitrate of silver, which when dry will be entirely invisible; hold the paper over a vessel containing sulphate of ammonia, and the writing will appear very distinct. The letters will shine with the metallic brilliancy of silver.

6. Write with a solution of nitrate or acetate of lead. When the writing is dry it will be invisible. Then having prepared a glass decanter with a little sulphuret of iron strewed over the bottom of it, pour a little very dilute sulphuric acid upon the sulphuret, so as not to wet the mouth of the decanter, and suspend the writing, by means of the glass stopper, within the decanter. By an attention to the paper the writing will become visible by degrees, as the gas rises from the bottom of the vessel.

7. Write with a weak solution of sulphate of iron, let it dry, and it will be invisible. By dipping a feather in tincture of galls and drawing the wet feather over the letters, the writing will be restored and appear black.

8. Write with a similar solution, and when dry wash the letters in the same way with prussiate of potash, and they will be restored to a beautiful blue.

9. Write with a solution of sulphate of copper, wash as before with prussiate of potash, and the writing will be revived of a reddish-brown color.

10. Write on paper with a solution of nitrate of bismuth; when this is dry the writing will be invisible; but if the paper be exposed to sulphuretted hydrogen gas, the words will be distinctly legible.

11. A letter written with a diluted solution of bismuth, becomes, when dry, illegible: but a feather dipped in a solution of sulphuret of potash, will instantly blacken the oxide, and revive the writing.

TICKETING Ink, For Grocers, etc.—Dissolve 1 oz. of gum arabic in 6 oz. water, and strain; this is the mucilage; for a black color, use drop-black, powdered, and ground with the mucilage to extreme fineness; for blue, ultramarine is used in the same manner; for green, emerald green; for white, flake white; for red, vermilion, lake, or carmine; for yellow, chrome yellow. When ground too thick, they are thinned with a little water. Apply to the cards with a small brush. The cards may be sized with a thin glue, and afterwards varnished, if it is desired to preserve them.

TRANSFER Ink.—Mastic in tears, 4 ounces; shellac, 6 ounces; Venice turpentine, $\frac{1}{2}$ ounce; melt together; add wax, $\frac{1}{2}$ pound; tallow, 3 ounces. When dissolved, further add hard tallow soap (in shavings), 3 ounces; and when the whole is combined, add lampblack, 2 ounces. Mix well, cool a little, and then pour it into molds. This ink is rubbed down with a little water in a cup or saucer, in the same way as water-color cakes.—In winter, the operation should be performed near the fire.

URE'S.—Galls, 12 lbs., gum, 5 lbs., copperas, 5 lbs., rain-water, 12 gallons. Boil the galls in 9 gallons of water for 3 hours, adding water as it evaporates. Pour off the clear, add the strained solution of gum, dissolve the copperas separately; and mix the whole. To make 12 gallons.

VIOLET.—1. Take aniline violet, $\frac{1}{2}$ ounce, and digest it in 5 ounces of alcohol in a glass or an enamelled iron vessel for 3 hours; then add

a full quart of distilled water and heat gently for several hours, or until the odor of the spirit has disappeared; then mix in 2 drachms of gum arabic dissolved in $\frac{1}{2}$ pint of water, and allow the whole to settle. Experiment will determine for you the precise quantity of coloring matter that will be required.—2. Eight parts of logwood and 64 parts of water; boil down to one-half, then strain and add 1 part of chloride of tin.

VARIOUS OTHER Formulas for Black Ink.—1. A method of making this has been recommended which is worthy of notice. Put into a stoneware jar, containing a gallon of water, $\frac{3}{4}$ of a pound of bruised nutgalls, and then, 24 hours after, add 6 ozs. of copperas, 6 ozs. of gum arabic, and 4 or 5 drops of creosote. The vessel is to be closed and left for 2 or 3 weeks, but shaken every 2 days. The contents are then allowed to settle, and the clear liquor will be fit for use, of a deep black.—2. To 1 gal. boiling soft water, add $\frac{3}{4}$ ounces extract logwood, boil 2 minutes, remove from the fire and stir in 48 grains of bichromate of potash, 48 grains of powdered gum arabic, and 8 grains of prussiate potash. For 10 gallons, use $7\frac{1}{2}$ ounces extract of logwood, 1 ounce bichromate potash.—3. Take 2 ounces extract logwood; 1 gallon soft water; boil slightly, or simmer in an iron vessel 15 minutes; dissolve in a little hot water 24 grains bichromate of potash, 12 grains Prussiate of potash, and stir into the liquid a few minutes while over the fire; take off, and when settled, strain it twice through common muslin or sheeting cloth. The above ink is a jet black from the first, flows beautifully from the pen,

and is so indelible that even oxalic acid will not remove it from paper.—4. 1 pound of logwood is boiled for 2 hours with 7 pounds of water; the latter must be renewed as fast as it evaporates; after cooling, 50 grains of yellow chromate of potash are added, and the whole strained through a cloth. It is then ready for use.—5. Take copperas 4 ounces, nutgalls 12 ounces, logwood, 8 ounces, gum arabic 1 ounce, glycerine, $\frac{1}{2}$ ounce, water 48 ounces, all the substances are to be pulverized and boiled for 1 hour together; they are then set to cool, strained through a flannel bag, and after that filtered through a folded filter. A drop of oil of cloves is added, the whole well shaken and filled into bottles.

WRITING WHICH DISAPPEARS IN A FEW DAYS, Ink for.—A piece of sal ammoniac is placed for 4 or 5 days in nitric acid, and then powder of touchstone, such as jewelers use for trying gold and silver, is mixed with the liquid in sufficient quantity, this gives a writing fluid which bleaches after six to eight days. A still better ink of this kind may be obtained as follows: Boil four ounces crushed gall-nuts in diluted nitric acid, and add two ounces sulphate of iron and some chloride of ammonium. Writing done with this mixture will disappear in a few days.

YELLOW.—1. French berries, 1 pound; alum, 2 ounces; water, 1 gallon. Boil and strain, then add gum arabic, 4 ounces.

2. A little alum, added to saffron, in soft hot water, makes a beautiful yellow ink.

MEDICAL AND SURGICAL.

ABORTION.—The expulsion of the human foetus, after the sixth week, and before the sixth month of pregnancy. In its most extended sense, the term has been applied synonymously with miscarriage. The latter term, however, has been generally restricted to the first six weeks after conception. The expulsion of the foetus after the sixth but before the ninth month, is termed premature labor.—**Causes.**—Nervous irritability, plethora, advanced age, scurvy, syphilitic, scrofulous, or mercurial taints, malformation of spine or pelvis, luxurious and indolent habits of living, excessive indulgence of the passions, extreme terror, anger, joy, etc.; falls, blows, violent exercise, vomiting, coughing, and rough purgatives; hot baths, stimulating liquors, and other excitants generally.—**Treatment.**—Avoid all the above mentioned exciting causes, and immediately on the appearance of any suspicious symptoms seek a recumbent posture, and repose in every shape practicable. An aperient should be taken, and should there be much hemorrhage, injections of cold water, or cold infusion of black tea, must be had recourse to. A cold hipbath, or sponging the lower part of the body with water and vinegar, often proves successful. Should the symptoms continue unabated, medical assistance should be sought. Should the preceding measures prove ineffectual, and no violent symptoms

supervene, the remaining treatment may consist in continuing the recumbent posture, keeping the bowels regular, taking a light nutritious diet, and avoiding exposure to draughts of cold air. This treatment may be gradually abandoned by the patient for her usual course of life, in proportion as she feels herself able to do so. In many cases, however, the only treatment required throughout, is simply the adoption for a few days of the recumbent posture, gentle laxatives, and a light nutritious diet.

AGUE.—A species of fever which comes on only at stated intervals, (hence called intermittent,) leaving the patient between the periods of attack, in apparently good health. The attacks of this disease usually return with great regularity, and have in consequence been distinguished by names having reference to the periods of their visits. From this characteristic nosologists have divided them into the

Quotidian,	returning after a lapse of 24 hours.
Tertian	“ “ “ “ “ 48 do.
Quartan	“ “ “ “ “ 72 do.

and so on until the interval extends to 9 or 10 days, as in the nonanus and decimanus.—**Symp.**—The cold stage, marked by debility, paleness, coldness, drowsiness, and general rigors throughout the body, impaired respiration, nausea, vomiting, etc. These symptoms gradually abate, and

are followed by—2. The *hot stage*, distinguished by the usual marks of fever, and, in some cases, violent delirium, etc. After a certain time the disease passes into—3. The *sweating stage*, marked by a copious perspiration breaking out, and a gradual return of most of the functions of the body to their ordinary state. In many cases, however, not only do the symptoms, but the succession of the stages and their duration also vary.

—*Causes.* Exposure to the miasmata of marshes and stagnant water, putrefying animal and vegetable matter, etc., poor diet, exposure to cold and damps, damp bed-chamber or linen; excessive grief, fatigue, etc. To cure without quinine,—take mandrake root, fresh dug, pound it, and squeeze $1\frac{1}{2}$ tablespoonfuls of the juice, add an equal quantity of molasses, divide into 3 doses of 1 tablespoonful each, to be given 2 hours apart, commencing so that all will be taken before the chill. Then steep dogwood bark (some call it boxwood), make it strong, and continue to drink it freely for a week or two at least.

AGUE in the BREAST.—Take 1 part of gum camphor, 2 parts yellow beeswax, 3 parts clean lard; let all melt slowly, in any vessel, (earthen best,) on stove. Use either cold or warm; spread very thinly on cotton or linen cloths, covering those with flannel. No matter if the breast is broken, it will cure if persevered in. Do not, no matter how painful, cease from drawing milk from the breast that is affected.

ANKLE, SPRAINED.—Wash the ankle frequently with cold salt and water, which is far better than warm vinegar or decoctions of herbs. Keep your foot as cold as possible to prevent inflammation, and sit with it elevated on a cushion. Live on very low diet, and take every day some cooling medicine. By obeying these directions only, a sprained ankle has been cured in a few days.

APOPLEXY.—Occurs only in the corpulent or obese, and the gross or high livers. To treat, raise the head to a nearly upright position; unloose all tight cloths, strings, etc., and apply cold water to the head and warm water and warm cloths to the feet. Have the apartment cool and well ventilated. Give nothing by the mouth until the breathing is relieved, and then only draughts of cold water.

APPETITE, Loss of.—This may be caused by the use or abuse of stimulants, tobacco or violent mental emotion, and can be remedied by the avoidance of the exciting cause, regularity in eating and simplicity in diet.

ASTHMA.—A disease characterized by difficulty of breathing, coming on by fits, accompanied by a wheezing sound, cough, and tightness of the chest, and generally terminating in a copious expectoration, after the lapse of a few hours. Asthma is principally confined to the later periods of life, and appears in many cases to be hereditary. The fits vary from two to several hours' duration. Sometimes copious expectoration attends asthma, which has led to its division into two kinds,—dry (asthma siccum) and humid, (asthma humidum). It is brought on by sudden exposure from heat to cold, to unwholesome effluvia, by hard drinking, full meals, violent exercise, and by cold, damp, and foggy weather.—*Treatment.* Avoid the above exciting causes. Seek a dry, warm, and airy situation. Wear flannel, keep the bowels regular, and the stomach in order. The severity of the paroxysm

may be lessened by adopting the sitting posture, and inhaling the vapor of hot water, or an infusion of chamomile. Emetics and diaphoretics, followed by mild purgatives, may also be administered with advantage. Various other remedies have also been recommended; among them are the following:—

ASTHMA, Cure for.—1. One ounce boneset, one ounce slippery elm, one ounce flax-seed, stick liquorice. Simmer together in one quart of water, strain carefully, add one pint of the best molasses and one half pound of loaf sugar. Simmer them altogether and when cold, bottle tight.

—2. A tea made from the leaves of the common chestnut, which have fallen from the tree in autumn, sweetened well, and used as a common drink for 2 or 3 months has effected a cure. A light nutritious diet and strictly regular habits should be adopted, which will often produce a marked improvement and effect a cure, when medicines have failed.

ATROPHY.—A wasting of the whole body—generally produced by the body receiving an insufficient supply of nourishment, arising from imperfect digestion, diarrhoea, and in children, very frequently from worms. The best treatment is to keep the bowels regular, and administer mild tonics, or alteratives, accompanied with a nutritious diet; cleanliness, fresh air, and moderate exercise are also essential. When worms are the cause, attempts should be immediately made to remove them.

BACK, Weak.—Take a beef's gall, pour it into 1 pint alcohol, and bathe frequently. It acts like a charm. Avoid the use of corsets and all constrictions of dress.

BATHERS, Aphorisms for.—Avoid bathing within two hours after a meal.

Avoid bathing when exhausted by fatigue or from any other cause.

Avoid bathing when the body is cooling after perspiration; but

Bathe when the body is warm, provided no time is lost in getting into the water.

Avoid chilling the body sitting or standing naked on the bank or in boats after having been in the water.

Avoid remaining too long in the water. Leave the water immediately there is the slightest feeling of chilliness.

Avoid bathing altogether in the open air if, after having been a short time in the water, there is a sense of chilliness with numbness of the hands and feet.

The vigorous and strong may bathe early in the morning on an empty stomach.

The young and those that are weak, had better bathe three hours after a meal. The best time for such is from two to three hours after breakfast.

Those who are subject to attacks of giddiness and faintness, and those who suffer from palpitation and other sense of discomfort at the heart, should not bathe without first consulting their medical adviser.

BATH, The cold.—Temperature 35 to 65 degrees. The application of cold water to the surface of the body is attended with an immediate tonic effect. This is evident from the glow which takes place and the sense of renewed strength indicating an increased action in all the vessels of the system. The application of the cold water possesses the power of contracting the solid parts

of the body, and this contraction is followed by a reaction in which the nerves, bloodvessels and all the organs of the system are excited to a more healthy and energetic performance of their functions. The best method of taking a cold bath is in the sea or in a river, and it is well not to protract the process, since the benefit derived depends on the first impression the cold water makes on the skin and nerves.

BATH, The Shower.—The shower bath is most useful when there is any determination of the fluids to the head. Several other reasons may here be stated for the superiority of the shower bath. The sudden contact of the water which in the ordinary cold bath is but momentary, may in the shower bath be prolonged, repeated, and modified at pleasure. The first shock is received on the head, and the blood is therefore impelled downwards; the shower bath descends in single streams and drops, and for this reason is more stimulating and pleasant than immersion in cold water. It is indeed an indefinite repetition of the one single effect produced by a plunge into cold water, and it is easily procured and readily adapted to the circumstances of the patient.

BATH, The Tepid.—The water for this bath ought to be from 85 to 95 degrees of the thermometer. The tepid bath has much efficacy in reducing the general excitement, lessening the pulsation in fevers, and is of great service in pregnancy and infancy. It is also very important in complaints of the stomach and liver, in the debility produced by long residence in hot climates, in the languor and weakness accompanying delicate habits, and in gout, rheumatic affections, and cutaneous diseases. It is admirably adapted for persons in advanced life. The best period for the bath is the morning, between ten and twelve o'clock.

BATH, The Warm.—For this bath the water should be from 93 to 98 degrees of heat. It is of great utility in a variety of ailments, such as inflammatory and rheumatic affections, diseases of the skin, intestinal obstructions, nervous irritation, and debility, whether constitutional or arising from previous illness, intemperance, late hours and hard study, or irregularity in diet or exercise. Women, who are delicate, weak, and nervous, may, with much confidence, expect relief from the use of a warm bath. If the warm bath is not intended to produce perspiration, it can properly be used at any time from an hour after breakfast till dinner, but if increased perspiration be the object the evening is the best time for this bath, and the patient should be conveyed from the bath to a warm bed.

BATH, The Hot.—Temperature 98 to 104 degrees. Bathing in tepid and warm water has a sedative effect. It excites the sensation of heat, lowers the pulse, relaxes the skin, diminishes excitement, and proves eminently refreshing. On the contrary, hot baths are stimulating; they quicken the action of the heart, redden the skin, make the respiration more frequent, and produce copious perspiration.

BATH, The Vapor.—100 to 115 degrees. This species of bath is recommended for the same classes of ailments for which the warm bath is applicable, and it has not unfrequently succeeded in producing the desired effects when warm bathing has failed to do so.

BATH, The Turkish.—This bath, has been

greatly lauded, by those interested, as a perfect panacea for all human ills, whereas it has been proven by impartial judges that its use, only occasionally, does grievous harm to the strength of the person, and invariably retards a recovery to perfect health. Every time a Turkish bath is taken, the patient, whether healthy or sickly loses a certain proportion of his vital force—of his ability to generate life power, and in this way, is lost the power to resist contagious or inflammatory diseases. The lungs are also injured, they cannot help being so, breathing such a super-heated atmosphere as is attached to Turkish baths. The healthy, and elastic tone of the skin of the whole body is impaired. The most effeminate, idle and unprogressive of all nations—the Turks—are made largely so, by the use of this bath, (where it originated) and its almost invaluable accessories,—tobacco, coffee and licentiousness.

BATH, The Russian.—The remarks made under the heading of Turkish Baths, apply with equal force to the Russian, and should be avoided, by all who wish to keep their strength of body intact, or to recover from sickness.

BILIOUSNESS.—Persons subject to bilious attacks should be particularly careful to avoid excess in eating and drinking, and should especially avoid using those articles of food which, from experience, they find to disagree with them. Tea, coffee, chocolate, tobacco, alcoholic liquors, sugar, sweetened food, and grease in any shape, if avoided will have a marked effect on a speedy recovery.

BLOOD, Spitting of.—1. Take two spoonfuls of the juice of nettles every morning, and a large cup of the decoction of nettles at night, for a week.—2. Take three spoonfuls of sage-juice in a little honey. This presently stops either spitting or vomiting blood.—3. Take twenty grains of alum in water every two hours.

BLOOD, Transfusion of.—This operation may be described in six parts:

1st. Preparation. The points to be attended to are—to have a good light; the two subjects to be operated on close to one another; two glasses standing in a basin of water at temperature of 29° R.; a bundle of fine, clean twigs; a fine piece of linen to strain the blood through after defibrination; a bistoury, scissors, thermometer, sponges, restoratives, cold water. Also, a stout double thread, and ear-sound, or Dechampsche' needle.

2d. Consists of bareing and binding the arm as for venesection; choosing the largest vein; making an incision one and a half inches long parallel and down to it. If there be any bleeding it must be checked by cold, and the vein, as it lies in the centre of the cut, must be carefully dissected loose from the cellular tissue for about half an inch, and the double thread be passed under it. A cold-water compress should now be laid on the wound.

The 3d act consists in drawing five or six ounces of blood into one of the glasses, whipping it five to eight minutes with the bundle of twigs, and then straining it into the other glass.

The 4th act consists in placing the canula in the vein. The latter is drawn out of the wound by the threads—the bandage having been previously taken from the arm, and a V-shaped piece, two lines long, cut out of the vein with the scissors, or the vein cut half through. The canula

or tube of the syringe is now introduced, it having been previously warmed and carefully filled with blood, so that no air may be contained in it (the point in this respect must be especially looked to). When the tube is inserted the threads must be tied around it tightly, so as to prevent any escape of the blood. Some use a Nussbaum's or conical canula, which itself fills up the vein and prevents any return of the blood.

The 5th act is the transfusion proper. The blood must be forced into the vein very slowly and carefully, always remembering the results of the introduction of a little air. The point of the warmed syringe should never be entirely emptied. If a refilling of the syringe is required the vein should be held just above the point of the canula.

The 6th act consists of placing a large wet compress over the wound, and binding it firmly by a roller bandage. Sticking-plaster and other methods of drawing the lips of the wound together should be eschewed, as conducive to phlebitis.

Woman's blood should always, if possible, be used in injecting into a woman, man's blood for a man, although, if necessary, this precept may be departed from. The blood should be taken only from a strong, healthy individual. Blood defibrinated by whipping is preferable to simple blood, unless time be so important that the few minutes occupied in preparing it are of consequence. If simple blood be used, it must be taken into the syringe as fast as it flows from the veins, as exposure to the air favors greatly coagulation.

BOILS.—Boils are first formed from a little knot of veins, nerves, etc., as warts and corns. It first shows itself in a small, tender, red spot, which continues to enlarge for four or eight days, when it opens and discharges a little pus and blood, and exposes to view a mass of dead matter, called the core. In two or three days more this comes away, and the cup-like cavity gradually fills up. When there are many of them in succession, constitutional treatment is needed; generally the blood lacks alkalies, which must be supplied; or it may need iron. A boil should always run its course, and should not be disturbed, except to apply a flaxseed-poultice, when painful. An incipient boil may be stopped by touching it with lunar caustic. It is well to poultice a boil for two or three days after it opens, and after these a stimulating salve. *To Prevent*, eat simple food, and less of it, and avoid grease, sugar, and hot drinks.

BOWELS, Acute Inflammation of.—This is an inflammation of the mucous membrane which lines them, as it is generally understood, but really involves more or less the whole substance of the bowel.—*Symptoms.*—The disease begins with a chill, and with uneasiness and slight griping pains, which increase in severity until they are intense and burning. Pressure aggravates the pain, which is greatest about the navel, but extends over the whole bowel. There is sickness at the stomach, and sometimes vomiting; loss of strength, costiveness, great anxiety, thirst, heat and fever, dry, furred, and red tongue, and but little urine, with pain in passing it. The matters passed from the bowels are dark and fetid, and the whole belly is sore to the touch. The pulse is quick, hard, and small. If the stomach sympathizes but little with the disease, it indicates *the seat of it to be in the lower portion of the*

bowels. The length of time, also, before drink and medicine are vomited up after being swallowed, is a pretty sure indication of the distance of the disease from the stomach. To discriminate this disease from colic, it is necessary to know that pressure produces pain, which it does not in colic; the pain never wholly ceases, as it does in colic; the knees are drawn up and the breathing short, or altered, as they are not in colic.—*Treatment.*—Hot fomentations, mustard-poultices, soothing and quieting injections, cooling drinks, such as slippery elm, flaxseed-tea, etc., with tincture of veratrum viride in full doses, or ten drops every hour, to keep up a free perspiration, will generally be all that is necessary. If the disease has been occasioned by the strangulation of a gut, or by hernia, it is very unmanageable. The gut may be disentangled by applying a large dry cup, or, what is better, a number of small ones, but the tenderness of the belly makes this difficult.

BOWELS, Chronic Inflammation of.—The signs of this disease are, a dull pain in the belly, the tongue bordered with red, abdomen either swelled or flat, skin dry and husky, cold extremities, small, frequent pulse, thirst, loss of flesh, low spirits, scanty urine, slimy discharges from the bowels from one to four times a day. The treatment commences with mustard-poultices, and hot fomentations. Cold compresses at night, the body well covered up in flannel, should be used if the bowels are very feverish. The warm bath twice a week, taking care not to get cold. The diet must be very simple and unstimulating—beginning with gum water, rice or barley-water, sago or arrow-root gruel, and gradually raising it to chicken-broth, beef-tea or tender beef-steak. Gentle carriage-exercise, as soon as the patient is able, will prove beneficial. A very mild laxative should be given on the inflammation being subdued.

BRAIN, Inflammation of.—Acute and general inflammation of the brain has two stages. *The stage of excitement*, in which there is intense and deep-seated pain in the head, extending over a large part of it, a feeling of tightness across the forehead, throbbing of the temporal arteries, a flushed face, injected eyes, looking wild and brilliant, contraction of the pupils, great shrinking from light and sound, violent delirium, want of sleep, general convulsions, a parched and dry skin, a quick and hard pulse, a white tongue, thirst, nausea and vomiting, and constipation of the bowels. *The Stage of collapse*, in which there are indistinct mutterings, dull and perverted hearing and vision, double vision, the pupil from being contracted expands largely and becomes motionless, twitchings of the muscles, tremors and palsy of some of the limbs, a ghastly and cadaverous countenance, cold sweats, profound coma, and death. The disease will not show all these symptoms in any one case. It runs a rapid course, causing death, sometimes, in twelve or twenty-four hours; or it may run two or three weeks.—*Treatment.*—The treatment should be very energetic, and early administered. The measures usually employed are cold water applications to the head; hot application to the feet, and emptying the bowels by copious injections of water.

BRAIN, Enlargement of.—This chiefly affects children, and consists in an unnatural growth of the brain. The skull may grow with it, and there

be no symptoms of disease, though children with this large brain are apt to die of some brain disease. The symptoms of enlargement of the brain are, dullness of intellect, indifference to external objects, irritable temper, inordinate appetite, giddiness, and habitual headache. Sometimes there are convulsions, epileptic fits, and idiocy. There is also a peculiar projection of the parietal bones in this disease.—*Treatment.* As much as possible, repress all exercise of the mind. Do not suffer the child to go to school; but put it to the most active and muscular exercise in the open air. The moment there is any heat in the top of the head, apply cold water, ice, or cold, evaporating lotions. The diet should be very simple, bread and milk only, if, as the child grows up, the signs of disease increase.

BRAIN, Softening of.—When this follows inflammation, the most marked symptom is the rigid contraction of the muscles which draw up the limbs; the hand may be clenched and pressed against the shoulder; or the heel drawn up to the hip. The other symptoms are—tingling and numbness in the ends of the fingers; perverted vision, or blindness; paralysis of one limb, or half of the body; difficulty of answering questions; forgetfulness, making it difficult sometimes for the patient to remember his own name.

BREATH, Fetid.—Scarcely any thing is more disagreeable or disgusting than a stinking breath. Various means have been proposed to remove this annoyance, depending principally on the administration of aromatics, which by their odor might smother it for a time; but these require continual repetition, and are liable to interfere with the functions of digestion. The real cause of a stinking breath is either a diseased stomach or carious teeth; when the former is the case aperients should be administered; and if these do not succeed, an emetic may be given, followed by a dose of salts, or castor oil occasionally. When rotten teeth are the cause, they should be removed; or, if this be impossible, they should be kept clean. Dirty teeth often cause the breath to smell. The use of the tooth-brush should be a daily habit. Occasionally rinsing out the mouth with a little clean water, to which a few drops of a solution of chloride of lime, or chloride of soda, has been added, is an effective method. The following lozenges have also been recommended:—

BREATH, (FETID) Lozenges for.—Gum catechu, 2 oz.; white sugar, 4 oz.; orris powder, 1 oz.; make them into a paste with mucilage, and add a drop or two of neroli. One or two may be sucked at pleasure.

BREASTS, Caked.—Boil a handful of camomile, and as much mallows in milk and water. Foment with it between two flannels, as hot as can be borne, every twelve hours. It also dissolves any knot or swelling in any part where there is no inflammation.

BRIGHT'S DISEASE, Milk in.—Dr. Arthur Scott Donkin extols a skim-milk diet in this disease. "The first appreciable action," he says, "of skim-milk taken to the extent of six or seven pints daily, is that of a most energetic diuretic, a profuse flow of urine being rapidly produced. The effect of this, in Bright's disease, is to flush the uriniferous tubules, and to dislodge and wash out the concrete casts of diseased epithelial cells by which they are blocked up and distended. This emptying of the tubules relieves

their pressure on the surrounding secondary capillaries; the blood begins to flow more freely through them; the distension of the primary Malpighian capillaries is relieved, less and less albumen escapes through their walls until the renal circulation is gradually restored, when it finally disappears from the urine. While this beneficial change is progressing, healthy epithelium is developed in the tubules, and the urinary excrement is withdrawn from the blood. In short, a healthy nutrition becomes re-established in the kidneys through the agency of milk, which, above all other substances, seems to exercise a controlling influence over this process.

BRONCHOCELE, (Enlarged neck.)—To cure take iodide of potassium, 2 drs.; iodine, 1 dr.; water, 2½ ozs.; mix and shake a few minutes and pour a little into a vial for internal use.—*Dose.*—Five to ten drops before each meal, to be taken in a little water.—*External application.*—With a feather wet the enlarged neck, from the other bottle, night and morning, until well.

BRONCHITIS, Acute.—This disease begins with chills followed by fever; tightness across the chest, difficulty of breathing, hoarseness, loss of strength, costive bowels, and a quick, hard pulse. Water runs from the eyes and nostrils, and there is a dry, harsh, croupy cough. After a few days mucus begins to be raised, which is thick and ropy, and occasionally streaked with blood. There is more or less pain in the chest; pain across the forehead, increased by coughing, and a pale, anxious countenance. In severe cases there is a tightness across the chest, causing the patient to call for the windows to be opened, to avoid suffocation. There is difficulty of breathing, a paleness and lividity of the cheeks and lips; a loud wheezing and rattling in the throat, followed by cold sweat, insensibility and death.—

Treatment.—In mild cases, give warm flaxseed or balm-tea, or hot lemonade—at the same time soaking the feet in warm water, and on retiring to bed, placing bottles of hot water to the feet and sides to produce sweating. If the bowels be costive, give rhubarb and magnesia, or salts and senna. In severe cases, an active emetic is needed, followed by tincture of veratrum viride in full doses, so as to reduce the pulse. The room should be kept warm, and the air should be moist, if there is difficulty of breathing. A gentle perspiration should be kept up, either by compound tincture of Virginia snake-root, by tincture of veratrum, or by frequent bathing of the surface. A mustard-paste on the chest, and soles of the feet, is important; and the diet should be of barley-water, toast-water, rice-water, or a solution of gum-arabic. The cough may be managed by a mixture of tincture of lobelia, half an ounce; syrup of squills, half an ounce. Mix and give twenty drops four or five times a day.

BUNION.—The bunion, or swelling on the ball of the great toe, is produced by the same cause as the corn—pressure and irritation by friction. It may be checked in their early development by binding the joint with adhesive plaster and keeping it on as long as any uneasiness is felt. The bandaging should be perfect, and it might be well to extend it round the foot. An inflamed bunion should be poulticed, and larger shoes be worn. Iodine, twelve grains; lard or spermaceti ointment, half an ounce, makes a capital ointment for bunions. It should be rubbed on gently twice or thrice a day.

BURYING ALIVE.—To know when death has really occurred and so prevent burying alive hold a lighted candle to any portion of the body, a blister will soon rise; if on puncture it gives out a fluid substance, death has not taken place; if it emits air only, it is perfectly certain that life has become entirely extinct, for which we offer but one reason among others, in case of actual death the blood is congealed in a sense, there is no moisture, simply a little air, this being rarified under the flame, raises up the skin; if there is life, the flame causes an inflammation and nature, in her alarm, sends increased material there for repair, a kind of glairy fluid, and this being sent there in excess, causes the skin to rise; inability to feel the pulse or heart beat; cold skin, no dew on a bit of glass, none of these are conclusive, as there has been life, when none of these were observed.

CANCER, Treatment of.—Cancer has two stages: that of induration or stony hardness; the second, ulceration or open cancer. Cancer most often attacks the female breast, the skin, the tongue, the stomach, the neck of the womb, the lips, etc. It rarely occurs in subjects under thirty-five years of age, and not often in persons under forty-five.

The symptoms of cancer in the breast are, a puckered condition, and a dull, leaden color of the skin, a hard, knotty, and uneven feel, and occasional sharp pains. When it attacks the skin and mucous membrane, there is a hard, warty lump, which ulcerates after a time, producing an open sore, with a hard base. The sore discharges an irritating, excoriating matter, which has a peculiarly fetid odor, so offensive and so different from any other smell that it is seldom forgotten.

Various modes of treating cancer have been, at different times, recommended by the faculty and empirics. Among these, extirpation with the knife appears to be most in favor with the former, when practicable. The removal of the tumor does not, however, destroy the constitutional taint, although it may lessen its intensity, and render the subsequent treatment of the disease less difficult. Recently, the application of intense cold has been highly recommended in cancerous affections of the glands. A little pounded ice is tied up in the corner of a thin silk handkerchief or a piece of bladder, and the "pad" thus formed pressed gently against the tumor and the parts immediately adjacent for a short time, once or twice a day. The degree of cold may be increased by mixing an equal weight of common salt with the pounded ice, by which the benumbing effect of the application will be greatly augmented. It should be frozen solid to its roots, after which the skin should be carbolicized to insensibility, and a crucial incision made down to, but not into, the tumor, in which the caustic, consisting of chloride of zinc; carbolic acid, and tannin, is to be inserted and allowed to remain five hours, after which time it becomes very painful and should be removed. Then cover with a mild poultice. In four or five days the cancerous mass will slough off.

The reason why a cancerous tumor should not be cut into, nor cut around, is, that the minute germs, cells, or molecules, which constitute its nuclei, may be diffused into the adjacent structure, and in a few months reproduce the cancer; and this is why the ordinary practice of surgeons in cutting them out never cures, while the caustic

treatment if properly managed, destroys these germs, and results in permanent recovery.

CANCER, Other Remedies for.—Common salt has been put forth as a remedy by Col. Usory, of De Soto, who says he learned the secret of a Spanish woman. His mode of using this remedy is as follows: Take an egg and break it, pour out the white, retaining the yolk in the shell, put in salt, mix it with the yolk as long as it will receive it, and stir them together until a salve is formed; put a portion of this on a piece of sticking plaster, and apply it to the cancer twice or thrice a day. He says that he has tried the remedy twice in his own family, with complete success.—2. The following is said to be a sure cure for cancer: A piece of sticking plaster is put over the cancer, with a circular piece cut out of the centre, a little larger than the cancer, so that the cancer and a small circular rim of healthy skin next to it is exposed. Then a plaster, made of chloride of zinc, bloodroot, and wheat flour, is spread on a piece of muslin the size of this circular opening, and applied to the cancer for twenty-four hours. On removing it, the cancer will be found burned into and appear of the color and hardness of an old shoe sole, and the circular rim outside of it will appear white and parboiled, as if scalded by hot steam. The wound is now dressed, and the outside rim soon separates, and the cancer comes out in a hard lump and the place heals up. The plaster kills the cancer, so that it sloughs like dead flesh, and never grows again. The remedy was discovered by Dr. Fell, of London, and has been used by him for six or eight years with unflinching success, and not a case has been known of the reappearance of the cancer when this remedy has been applied.—3. A salve made from the juice of the wood sorrel, gathered in a green state, the juice expressed and evaporated to the consistency of a paste, on a pewter plate, in the sun, and applied to the cancerous part, will,—it is said—successfully remove the diseased part. The oxalic acid of the plant acts upon the lead, and the product is a salve which operates with more healing power on cancerous sores than anything so easily obtained.—4. Boil fine Turkey figs in new milk, which they will thicken; when they are tender, split, and apply them, as warm as can be borne, to the part affected, whether broken or not; the part must then be washed, every time the poultice is changed, with some of the milk; use a fresh poultice night and morning, and at least once during the day, and drink a quarter of a pint of the milk the figs are boiled in, twice in the twenty-four hours. If the stomach will bear it, this must be persevered in three or four decades at least. The first application gives a good deal of pain, but afterwards each dressing gives relief.—5. The latest discovered remedy is a plant called "cundurango" discovered in Ecuador. This is said to be a specific, but from the limited use of it at this date of writing, it is impossible to positively determine its supposed specific qualities.

CANKER.—To cure take 1 large teaspoonful of water, 2 teaspoonfuls of honey, 2 of loaf sugar, 3 of powdered sage, 2 of powdered goldthread, and 1 of alum. Stir up all together; put into a vessel, and let it simmer moderately over a steady fire. An oven is better. Then bottle for use. Give a teaspoonful occasionally through the day.

CARBUNCLE.—This is a large and painful boil, having a surface more flat than a boil, and

greater inflammation. The constitutional symptoms are also more severe. It generally appears on the thighs, back or buttock, and goes through the same process as a boil, only discharging a much larger core. To treat make an incision the full extent of the carbuncle, and stuff it with cotton saturated with pure carbolic acid, also painting the whole surface of the hardened mass with the acid. This will be followed with a sharp, burning sensation for a few minutes, after which the pain will subside completely and will not again appear. In the same way the insertion of the acid is to be renewed daily until a cure is effected.

CATARRH.—Catarrh is generally only a cold—if it becomes chronic it assumes a different form. The phlegm or waste matter becomes acrid and almost poisonous, and serves to keep up the disease. The phlegm or waste matter appears to be matter which is not carried off by the usual channels. The remedy when the catarrh is not of long standing is the same as for a cold—restore the perspiration. This can be done by drinking warm gruel, or hot lemonade, and putting the feet in hot water, and going to bed immediately. Or by wringing out a towel in tepid water and applying to the throat and chest, putting two or three dry ones over it, so that the chest and throat are well covered. Warm drinks help this also. The hot air bath, made by putting a lamp on the floor, and sitting over it in loose but warm clothing, the whole carefully surrounded by blankets, is also a good process. Of course it needs to be carefully conducted. Its purpose is also to induce perspiration. Sometimes a cold runs into catarrh by such slow degrees as not to be noticed until the patient begins to feel as if there were a thread or hair in the roof of his mouth or throat. This is the beginning of chronic catarrh. The phlegm is becoming a source of disease. In connection with the above any of the following local application may be used.—1. Snuff strong salt water three times a day; draw up into the nostrils from the palm of the hand all that can be taken, then close the nostrils and retain the salt water as long as it can be endured. It is quite painful, but the cure depends wholly upon this. Cleanse the part affected thoroughly each time it is used.—2. Dr. Pallon, a French physician, has discovered that ammonia inhaled through the nose will cure catarrh. If the case is severe, the inhalation should be continued until the sense of smell is restored, when it should cease for a minute, and then re-applied for a shorter period, and so repeated seven or eight times in the course of five minutes.—3. Take one part finely pulverized saltpetre, and mix with two parts white sugar reduced to flour. It must be snuffed up the nose a dozen times or more a day, according to the severity of the affection.

CAUSTICS, New Mode of Using.—The extreme danger of conveying infection on the point of a frequently used pencil of caustic, will recommend this simple device to the medical profession: Take a bundle of splints of wood, similar to lucifer matches; dip the ends in melted caustic, separate them, and allow them to dry. A fresh match of caustic may be used for each application, and a fine caustic point is thus always at hand. Lunar and carbolic acid, and all the solid caustic bodies, may be used in this manner.

CHAFING, Remedy for.—Among the annoyances to which persons of an obese physique are

subject in hot weather, especially if they walk much, is chafing in those parts where a conglomeration of muscles unite. Nothing is better, as a remedy and also as a preventive, than a lotion of alum in water. It should be applied with a soft linen or cotton rag at night, before retiring. A piece of alum as large as a hazel nut, dissolved in half a pint of water is sufficient. It will quickly heal excoriated skin and harden the unabraded cuticle. The use of this for years with the most beneficial results, is sufficient authority for trial of this simple remedy. It is good also for tender feet and soft corns.

CHILBLAINS.—An inflammatory swelling, of a purple or lead color, produced by the action of cold. Children, especially those of a scrofulous habit, and elderly persons are generally most liable to chilblains. The common cause of chilblains is holding the hands or feet to the fire, after exposure to cold. The sudden change of temperature partially destroys the vitality and prevents the proper flow of blood through the part. The best preventives of chilblains are woollen socks or stocking, good waterproof shoes, woollen gloves, exercise and friction. Among the cures for chilblains, are the following recipes:—1. Sulphate of copper, (blue vitriol), 1 oz.; rosemary water, 1 pt. Dissolve. Apply as a wash.—2. Sal ammoniac, 1 oz.; vinegar, $\frac{1}{2}$ pt.—3. Sal ammoniac, 1 oz.; rum, $\frac{1}{2}$ pt.; camphor, 1 dr. The affected part is wetted night and morning, and when dry, is touched with a little simple ointment of any kind—cold cream or pomatum.—4. Oil of turpentine, 2 oz.; camphor, 3 dr.; oil of cajeput, 1 dr. Apply with friction.—5. Sulphate of copper, 20 gr.; water, 1 oz. As a wash, and twice a day.—6. Hydrochloric acid, 1 oz.; water, 11 oz.—7. Olive oil, 2 oz.; white wax, 2 dr.; dissolved by the aid of heat; balsam of Peru, 1 dr.; hydrochloric acid, 2 dr. Mix well. To be used for unbroken blains.—8. Olive oil, $\frac{1}{4}$ pt.; white spermaceti, $\frac{1}{2}$ oz.; camphor, $\frac{1}{2}$ oz.; mix with heat; add hydrochloric acid, $\frac{1}{2}$ fluid oz. For unbroken blains and good.—9.—*Russian remedy.*—The rind of perfectly ripe cucumbers, with part of the flesh of the fruit tied on, having previously been soaked in warm water, with the inner side toward the affected part.

All the above are for unbroken chilblains.—10. For broken blains. Black oxide of iron, 1 dr.; bole, 1 dr.; oil of turpentine, 1 dr.; beeswax, $\frac{1}{2}$ oz.; rosin, $\frac{1}{2}$ oz.; sweet oil, $\frac{1}{2}$ oz.; or better still:—11. Rosin, 1 oz.; beeswax, 1 $\frac{1}{2}$ oz.; sweet oil, 3 oz.; calamine, (prepared carbonate of lead) $\frac{1}{2}$ oz. All but the last are melted together, and the last gradually stirred in until it is cool. Any bottom sediment is rejected.

Of all the recipes above given, we think the last the most valuable.

CHILDREN, Care of.—Dress children warmly, woollen flannel next their person during the whole year. By every consideration, protect the extremities well. It is an ignorant barbarism that allows a child to have bare arms, and legs, and feet, even in summer. The circulation should be invited to the extremities; warmth does that; cold repels it. It is at the hands and feet we begin to die. Those who have cold hands and feet are never well. Plenty of warmth, plenty of substantial food and ripe fruits, and plenty of joyous out-door exercise, would save millions of children annually.

CHLOROFORM, To prevent Death from.—Experiments on inferior animals show that they may be restored from apparent death by chloroform by the continuous galvanic current, the negative pole being put in the mouth and the positive pole in the rectum. In some cases the animal was left for two minutes in a state of apparent death and then restored.

CHOLERA.—The symptoms in this disease are, a derangement in the digestive organs, pain in the loins or knees, twitchings of the calves of the legs, impaired appetite, thirst, and a slight diarrhoea. These may last from a few hours to several days. It has been recently averred that the pulse is down to forty or fifty beats a minute for several days before the attack. In the second stage there is vomiting and purging of a thin, whitish fluid, severe cramps in the legs, and in the bowels and stomach. By these cramps the muscles are drawn into knots. The tongue is pale and moist; the pulse feeble, though sometimes full and firm; the breathing hurried, with distress about the heart; great thirst, with a feeling of internal warmth; and the secretion of urine entirely stopped. The watery portion of the blood is soon run off, and the patient sinks into the third stage, which is characterized by great prostration; pulse hardly perceptible; skin cold and clammy; face blue or purple, and eyes sunken; hands dark-colored and sodden; breathing short and laborious; great heat in the stomach, and intense thirst. Recoveries from this stage seldom take place. *Treatment.*—The usual treatment of this disease is with laudanum, administered every three hours, in doses of five to ten drops, to check the diarrhoea, in the first stage; and to give chloroform, opium, and other powerful narcotics. Pills made of pulverized camphor, half a dram; pulverized opium, sixteen grains; pulverized cayenne, half a dram, made into sixteen pills, and taken, one every hour, is a popular and often effectual remedy. It is as often, however, that the stimulants without the narcotics effect a cure. Brandy and cayenne, given freely, have proven very potent to arrest the disease. To these must be added warming injections; and the whole surface of the body must be warmed by hot bottles or bricks, by rubbing with flannel, and tincture of cayenne. The treatment must always be very active, as the disease makes rapid progress.

CHOLERA MORBUS.—This disease begins with sickness and distress at the stomach, succeeded by violent gripings, with vomiting of thin, dirty-yellowish, whitish, or greenish fluid, with discharges from the bowels similar to that vomited. The nausea and distress continue between the vomiting and purging, and the pain at times is intense. The pulse is rapid, soon becoming small and feeble, the tongue dry, the urine high-colored, and there is much thirst, though no drink can be retained on the stomach.

Treatment.—Apply a large mustard-poultice over the stomach and liver. Give large drafts of warm teas, by which means the stomach will be cleansed of all its solid contents. Every half-hour give tablespoonful doses of the compound powder of rhubarb and potassa, until the vomiting is checked. Warm injections must be given frequently, and hot bricks applied to the feet, while the whole body should be swathed in warm flannels. To get up a warmth of the body and the stomach, is, in fact, the most important

thing in this disease. Hot brandy, in which is a dose of cayenne, is excellent, to quiet the vomiting and griping. A few drops of laudanum in the injections may be given, if the pain is excessive; but generally it is not needed.

COLD, To avoid catching.—Accustom yourself to the use of sponging with cold water every morning on first getting out of bed. It should be followed with a good deal of rubbing with a wet towel. It has considerable effect in giving tone to the skin, and maintaining a proper action in it, and thus proves a safeguard to the injurious influence of cold and sudden changes of temperature. Sir Astley Cooper said: "The methods by which I have preserved my own health are—temperance, early rising, and sponging the body every morning with cold water, immediately after getting out of bed; a practice which I have adopted for thirty years without ever catching cold."

COLD, To put back.—So soon as you feel that you are taking a cold—and you will generally have notice before it amounts to much—place your feet into water made as warm as you can bear; and keep them there about ten minutes. Change them, then, into a vessel containing cold water—if icewater, all the better—and hold them into it about one minute; after which wipe dry and put on warm stockings.

COLD, To cure.—Before retiring soak the feet in mustard water as hot as can be endured, and to bear it at any great temperature, the feet should at first be plunged in a pail half full of luke-warm water, adding by degrees very hot water until the desired heat is arrived at; of course the upper part of the body and the knees should be well protected with a blanket. On getting into bed take a hot camphor sling. Take with one tablespoonful of white sugar twelve or fourteen drops of strong spirits of camphor, with two tablespoonfuls of boiling water. Rub the bridge of the nose between the eyes with a little oil. Cuddle in bed and sleep it off.

COLIC, BILIOUS.—This is a dangerous disease. There is griping, twisting, tearing pain, about the navel or sometimes over the whole belly. It comes and goes by paroxysms. Sometimes the abdomen is drawn in, at other times swelled out, and stretched like a drumhead. At first, the pain is relieved by pressure, but after a time the belly grows tender to the touch. There is thirst and heat, and a discharge of bilious matter from the stomach. In the worst cases, the pulse is small, the face pale, the features shrunk, and the whole body covered with a cold sweat. It is caused by irritating articles taken into the stomach, vitiated bile, long exposure to cold, torpid liver and skin, great unnatural heat, etc.—*Treatment.*—Administer an active purgative injection immediately. Give a mixture of pulverized camphor, four grains; cayenne, twelve grains; white sugar, one scruple. This, divided into four powders, and given once in fifteen minutes, will relieve the pain—at the same time mustard-poultice should be laid upon the belly. The sickness of stomach may be allayed by hot drafts over the stomach, in which are a few drops of laudanum. Also on the feet. Croton oil, one drop done up in a crumb of bread, will often purge successfully; or castor oil and spirits of turpentine, equal parts, in two great-spoonful doses, may be used before trying the other. A warm bath is good, and bottles filled with hot

water, placed at the feet and sides, to promote perspiration.

COLIC, WIND.—This is a severe and distressing pain in the bowels, sometimes a stoppage, and swelling about the pit of the stomach and navel. The complaint may be caused by weakness in the digestive organs, by indigestible food, unripe fruit, or costiveness.—*Treatment.*—If the pain is caused by having eaten any thing indigestible, an emetic should be immediately taken. If this does not bring relief, a dose of salts, or sweet tincture of rhubarb may. If there is no sickness at the stomach, a little essence of peppermint in water, may be sufficient to expel the wind and give relief. If there be costiveness, and continued pain, a stimulating injection should be given.

COLIC, LEAD.—Is a disease to which painters, and workers in red and white lead, are subject, causing severe pains, tedious sickness, and often death. The disease is partially owing perhaps to breathing the fumes, but mainly from particles taken into the stomach by the food which is handled. Workmen can effect a total exemption from the disease by attending rigidly to three things.—1. Keep the finger nails trimmed closely so as to prevent particles of lead from collecting under them and transference to the bread in eating it.—2. Wash the hands well with soap and water, and rinse the mouth before eating.—3. Drink half a pint of sweet milk at each meal to antagonize the influence of any particles of lead which may find their way into the stomach. It has been found in thousands of cases that an habitual attention to these things secures an entire exemption from lead colic.

CONSUMPTION.—Its symptoms and effects are only too well known. It remains only to be said, that where any such tendency exists, much may be done toward preventing its development, by attention to the general laws of health. Fresh air, out-door exercise, cheerful company, and all things that promote our best condition of health, will do something toward warning off this disease, or even to cure it.

CONSUMPTION, Remedy for.—The following is said to be an effectual remedy, and will in time completely eradicate the disorder. Live temperately—avoid spirituous liquors—wear flannel next the skin—and take, every morning, half a pint of new milk, mixed with a wine-glassful of the expressed juice of green hoarhound. One who has tried it says—"Four weeks' use of the hoarhound and milk relieved the pains of my breast, gave me ability to breathe deep, long, and free, strengthened and harmonized my voice, and restored me to a better state of health than I had enjoyed for years."

CORNS, To cure.—Corns are entirely owing to continued pressure, such as wearing small boots or shoes. At first they are the production of the outer skin only, but by gradually thickening they at length come to be connected with the true skin beneath, and even with the subjacent muscles. Prevention is better than cure. Wear woollen stockings, and see that there is no local and permanent pressure on any part of the foot.—To cure :—1. Put the feet for half an hour, two or three successive nights, in a solution of soda—two tablespoonfuls of soda, in a small foot tub of hot water. The alkali dissolves the indurated cuticle, and the corns fall out.—2. Tie a piece of raw cotton to the corn, and wet it several

times a day with spirits of turpentine; this will, in three days, cure the corn without the least apparent pain.—3. Soak the feet in warm water, pare off as much as possible of the horny part of the corn, then lay upon it a moistened wafer, and again upon this a piece of buckskin, with a hole cut through it the size of the corn. Renew the moist wafer twice a day, and in a few days the corn will work out.—4. To cure corns, take a lemon, cut a piece of it off, then nick it so as to let in the toe with the corn. Tie this on at night so that it cannot move, and you will find the next morning that, with a blunt knife, the corn will come away to a certain extent. Two or three applications will effect a thorough cure.—5. The strongest acetic acid, applied night and morning with a camel's hair brush. In one week the corn will disappear.—6. Dissolve glue as you would to mend furniture; spread it on the corns; place muslin rags over them to prevent the glue from sticking to the stocking; repeat the application a few times, and the cure will be effectual.

CORNS, SOFT, To cure.—Soft corns may also be easily removed by applying ivy leaf previously soaked in strong vinegar, changing the piece every morning; or by placing a dressing of soap cerate, spread on a bit of lint or old rag, between the toes. Or take a piece of cotton just large enough to fit comfortably between the toes, spread it out and sprinkle prepared chalk over it; then roll it up and place between the toes where the corn is. The cotton and chalk absorb the moisture from the toe, and, by keeping the corn dry, soon effects a cure.

COSTIVENESS, (Constipation).—This is a sluggish state of the bowels which causes them to retain the feces longer than warranted by health, is a very common disorder. In this complaint, it is not always the case that the discharges from the bowels are less frequent than they should be, but they may be less in quantity, hard, compacted, and passed with difficulty. It occasions headache, dizziness, feverishness, and bad feelings in the head not easily described, loss of appetite, sometimes nausea, but little desire to go to stool, a weight and heaviness about the lower part of the belly, and a sense of confinement over the whole body. The disorder is caused by sedentary habits, especially when connected with close application of the mind, astringent medicines, stimulating diet, nervous diseases, and irregular habits of evacuating the bowels.

Treatment.—The first thing to be done is to establish the habit of attempting to evacuate the bowels at a particular hour every day. The best hour for most people is just after breakfast in the morning. Whether successful or not, the effort should on no account be omitted, as this regularity will do much to break up the costive habit. To this should be added a diet composed of the most digestible food. Bread made from unbolted flour is the only suitable bread in this disorder. Fresh vegetables and fruit are the proper diet; and puddings, cakes, doughnuts, etc., must be avoided until a cure is effected. Exercise, not to fatigue, between meals is important. Frequent bathing, and water injections, are the most certain and simple remedies. The injection should be taken just before going to stool, at the regular hour, and whenever the disposition to evacuate the bowels is felt, until they are able to relieve themselves without much effort.

COLD in the HEAD.—According to an

eminent French physician, a cold in the head can be cured by inhaling hartshorn. The inhalation should be by the nose, seven or eight times in five minutes.

COUGHS AND COLD, Remedies for.—1. Drop 3 eggs in 1 pint of vinegar, and let them stand for three days, then add $\frac{1}{2}$ pound of honey, and mix well together. Bottle tight, and take a wine-glassful night and morning. This remedy is unequalled.—2. Take one teacup of flaxseed, soak all night. In the morning put in a kettle, 2 quarts of water, a handful, split up, of licorice root, $\frac{1}{4}$ of a pound of good raisins, broke in half. Let them boil until the strength is thoroughly, extracted, then add the flaxseed, which has been previously soaked. Let all boil about half an hour more, watching and stirring, that the mixture may not burn. Then strain and add lemon-juice and sugar to taste. Take any quantity, cold, through the day, and half a thimbleful, warm, at night.—3. A coffee-cup of flaxseed, 2 quarts of water, boil several hours until reduced to a jelly; strain through a thin cloth, squeeze in the pulp and juice of a large lemon; roll $\frac{1}{4}$ of a pound of the best raisins, mix them in the jelly, simmer, without boiling, one hour; strain again, add half a teacup of the best loaf-sugar. Take a tablespoonful every hour.

COUGHS, Soreness or Hoarseness from.—Spikenard root, bruised and steeped in a tea-pot, by using half water and half spirits; then inhaling the steam, when not to hot, by breathing through the spout, will relieve the soreness and hoarseness of the lungs, or throat, arising from much coughing.

COUGH, WHOOPING.—The attack generally begins as a common cold, with slight feverish symptoms. In eight or ten days the fever partially subsides, and the child gets attacks of convulsive coughing, accompanied by the peculiar "whoop" which gives the disease its name. The number of attacks varies from one or two to ten, or even fifteen in the twenty-four hours, according to the severity of the disease. The child should be kept in a warm room. He ought to be clothed in flannel; his diet should be light and nourishing, such as fish, milk, light puddings, and new-laid eggs.

When the severity of the disease has passed off, change of air will be found most useful; and if the child has become debilitated, tonics with nutritious diet should be given.

This disease being very infectious, great care should be taken to prevent communication of any kind with houses where there are children who have not already had whooping-cough.

COUGH WHOOPING, Remedies for.—1. Into half a pint of white vinegar break a freshly laid egg; when the egg is dissolved, add half a pound of rock candy. Dose from three to four tablespoonfuls per day.—2. Onions and garlics, sliced, of each 1 gill; sweet oil, 1 gill; stew them in the oil, in a covered dish, to obtain the juices; then strain and add honey, 1 gill; paregoric and spirits of camphor, of each $\frac{1}{2}$ oz.; bottle and cork tight for use. Dose—For a child of 2 or 3 years, 1 tea-spoon 3 or 4 times daily, or whenever the cough is troublesome, increasing or lessening, according to age.—3. Mix a quarter of a pound of ground elecampane root in half a pint of strained honey and half a pint of water. Put them in a glazed earthen pot, and place it in a stone oven, with half the heat required to bake bread. Let

it bake until about the consistence of strained honey, and take it out. Administer in doses of a teaspoonful before each meal, to a child; if an adult, double the dose.

CROUP.—Croup seldom comes on suddenly. Generally it has at first no other symptoms than those of a common cold, but the very moment the child is seen to carry his hands towards his throat, indicating discomfort there, it should be considered an attack of croup, and should be treated accordingly. In this disease, speedy action is important. The best treatment is by water. Immediately put cold, wet cloths upon the throat, and upper part of the chest, covered warmly by flannel, over the cloth. Change them often. Keep the wet cloths on until the inflammation is subdued. The moment a mother observes croupy symptoms in a child from two to eight years, the especially croupy age, she should keep the child in her own room, by her own side, day and night, not allowing it for a moment to go outside of the doors, keeping it comfortably warm, so that no chilliness or draft of air shall come over it. Light food should be eaten, no meats, hot bread or berries. The whole body, the feet especially, should be kept warm all the time.

CROUP, Other Remedies for.—1. Let a healthy person fill his lungs with pure air, then slowly breathe upon the patient's throat and chest, commencing at the point of the chin, and moving slowly down to the bottom of the windpipe. Repeat for a few minutes and it will give relief in cases where all other means fail.—2. Cut onions into thin slices; between them put brown sugar and let it dissolve; a teaspoonful of the syrup will give instant relief.

DEAFNESS.—When deafness is present in infancy and childhood, it is accompanied with dumbness, or imperfect articulation, in consequence of the impossibility of conveying a knowledge of the sounds necessary for the exercise of the imitative faculty of speech. A common cause of deafness is some imperfection or obstruction of the passage leading to the membrane of the tympanum or drum of the ear. In some cases this passage is totally occluded by a membrane, or some malformation of the tube, which may frequently be removed by a surgical operation. Even instances of partial obliteration of this passage have occurred, which have been effectually cured. A more frequent cause of deafness is, however, the presence of foreign bodies in the aural passages, or the accumulation of hardened wax. In these cases the best treatment is to inject warm water into the ear by means of a proper syringe, the head being placed with that side upwards during the operation. Insects may be destroyed by pouring a spoonful of warm olive oil, or camphorated oil, into the ear over night, retaining it there until the next morning by means of a piece of cotton wool, when it may be washed out with a little mild soap and warm water. When there is a deficient secretion of wax, or a dryness of the aural passage, mild oleaginous stimulants should be employed. For this purpose a little olive or almond oil, to which a few drops of oil of turpentine, oil of juniper, or camphor liniment, have been added, may be used with advantage. When deafness is accompanied with continued acute pain, or a discharge of a purulent matter, inflammation of the tympanum, or some other

portion of the internal ear, probably exists, and medical advice should be sought as soon as possible. The deafness that frequently accompanies a violent cold, is generally caused by obstructions in the Eustachian tube, and goes off as soon as the secretions return to a healthy state. When imperfect hearing depends upon obtundity of the auditory nerve, or an extensive obliteration or malformation of the internal ear, it scarcely admits of cure.

DEAFNESS, Remedies for.—1. Oil of almonds 1 lb.; garlic, bruised 2 oz.; alkanet root $\frac{3}{4}$ oz.; infuse and strain. A little is poured into the ear in deafness.—2. Take a quarter of an ounce of shark's oil, ten drops of laudanum, and five drops of turpentine, mix. Put three drops in each ear every morning, and insert soft wool, so as to keep out the cold.

DEAFNESS (Temporary) To Cure.—Temporary deafness, arising from cold, sitting in a draught, and other causes, may be relieved and cured by letting fall into the ear ten drops of a mixture of sweet oil and one of glycerine every night, until the duct which leads from the ear to the nose is cleared; this will be known by the sensation of the fluid passing from the ear into the nostril.

DEATH, Sure Sign of.—Stick a needle an inch or so into the supposed corpse. In the living tissues the needle will soon become tarnished and oxidised, whilst in the actually dead it will retain its polish. See also "Burying alive."

DELIRIUM TREMENS.—The greatest difficulty in the treatment of mania-potu is to procure sleep, which is the indispensable condition of recovery. The desideratum seems to have been secured in Dublin by the use of red pepper. In a case recently treated, a 60-grain dose made into a pill was taken without any difficulty. The immediate and sensible effects were a burning sensation in the mouth and throat, and a sense of diffused warmth through the stomach and bowels for a brief period subsequently. In less than an hour after the pill was taken the patient fell into a quiet sleep, and after two or three hours awoke perfectly calm, conscious and convalescent. The results thus obtained are fully borne out by the experience acquired, on a far larger scale of observation, in the West Indies and in the Melville Hospital, Dublin.

DIABETES.—To cure take syrup of yarrow $3\frac{1}{2}$ ozs. Mix—take 4 ounces once in 4 hours. This must be continued for 30 days, or until perfectly well. The food should be boiled beef-steak and nothing else, except a very little bread once a day. The bowels should be moved by a mild cathartic, one ounce (sixty grains) of Rhubarb at bed time.

DIARRHEA.—This is a looseness of the bowels occasioned either by unwholesome or irritating food, by inflammation of some portion of the bowels, or by debility. It is accompanied by a rumbling noise in the bowels, some bearing down and uneasiness just before an evacuation, and generally griping. The strength soon becomes reduced, the skin pale, dry, and after a time sallow.—**Treatment.**—The first, the most important, and the most indispensable item in the arrest and cure of looseness of the bowels, is absolute quietude on a bed. Nature herself always prompts this by disinclining us to locomotion. The next thing is to eat nothing but common

rice parched like coffee, and then boiled, and taken with a little salt and butter. Drink little or no liquid of any kind. Bits of ice may be eaten and swallowed at will. Every step taken in diarrhea, every spoonful of liquid, only aggravates the disease. If locomotion is compulsory, the misfortune of the necessity may be lessened by having a stout piece of woolen flannel bound tightly around the abdomen, so as to be doubled in front, and kept well in its place. In the practice of many years we have never failed to notice a gratifying result to follow these observances.

DIARRHEA, Remedies for.—1. Take one teaspoonful of salt, the same of good vinegar, and a tablespoonful of water: mix and drink. It acts like a charm on the system, and even one dose will generally cure obstinate cases of diarrhea or the first stages of cholera. If the first does not bring complete relief, repeat the dose, as it is quite harmless.—2. The best rhubarb root, pulverized, 1 oz.; peppermint leaf, 1 oz.; capsicum, $\frac{1}{4}$ oz.; cover with boiling water and steep thoroughly, strain, and add bi-carbonate of potash and essence of cinnamon, of each $\frac{1}{2}$ oz.; with brandy (or good whiskey) equal in amount to the whole, and loaf sugar, 4 oz. Dose—For an adult 1 or 2 table-spoons; for a child 1 to 2 teaspoons, from 3 to 6 times per day, until relief is obtained.—3. To half a bushel of blackberries, well mashed, add a quarter of a pound of allspice, 2 ounces of cinnamon, 2 ounces of cloves; pulverize well, mix and boil slowly until properly done; then strain or squeeze the juice through home-spun or flannel, and add to each pint of the juice 1 pound of loaf-sugar, boil again for some time, take it off, and, while cooling, add half a gallon of the best cognac brandy.

DIARRHEA (Chronic), Injection for.—New milk, with thick mucilage of slippery elm, of each 1 pint; sweet oil, 1 gill; molasses, $\frac{1}{2}$ pt.; salt, 1 oz.; laudanum, 1 dr. Mix, and inject what the bowels will retain.

DISINFECTANTS.—1. Quicklime, to absorb moisture and putrid fluids. Use fresh stone lime; finely powdered; sprinkle it on the place to be dried, and in damp rooms place a number of plates or pans filled with the lime powder. Whitewash with pure lime, and not with kalsomine.—2. Charcoal powder, to absorb putrid gases. The coal must be dry and fresh, and should be combined with lime. This compound is the "calx powder", as sold in the shops.—3. Chloride of lime, to give off chlorine, to absorb putrid effluvia and to stop putrefaction. Use it as lime is used, and if in cellars or close rooms the chlorine gas is wanted, pour strong vinegar or diluted sulphuric acid upon your plates of chloride of lime occasionally, and add more of the chloride.—4. Sulphate of iron (copperas) and carbolic acid, to disinfect the discharges from cholera patients and to purify privies and drains. Dissolve 8 or 10 pounds of copperas in a common pailful of water, and pour this strong solution into the privy, water-closets or drain, every hour, if cholera discharges have been thrown in those places; but for ordinary use, to keep privies or water-closets from becoming offensive, pour a pint of this solution into every water-closet pan or privy seat every night and morning. If there is cholera in the house or district, let carbolic acid be added to this iron solution—one half pint of the fluid acid to five gallons of the solution. Bed-pans and chamber-vessels are best disinfected

with this mixed solution using a gill at a time.—5. Permanganate of potassa, to be used in disinfecting clothing and towels from cholera and fever patients, during the night, or when such articles cannot be instantly boiled. Throw the soiled articles immediately into a tub of water in which there has been dissolved an ounce of the permanganate salt to every three gallons of water. Boil the clothing as soon as it is removed from this colored solution.—6. Carbolic acid, (fluid) may be diluted at the rate of from forty to one hundred parts of water to one of fluid acid. Use this solution for the same purposes as copperas is used; also to sprinkle upon any kind of garbage or decaying matter, and on foul surfaces or in drains. When used to disinfect clothing, carbolic acid of good quality should be thoroughly mixed with its own quantity of strong vinegar, and next be dissolved in two hundred times its own quantity of water, before the clothing is immersed in it. This mixture with vinegar insures such complete solution of the carbolic acid that the clothing will not be "burned" by undissolved drops of acid when disinfected in the carbolic water. This weak solution (1 part to 200) will not injure common clothing. But to destroy clothing as well as infection, instantly, use the acid diluted only ten to thirty times in its own quantity of water. The disinfecting and antiseptic power of good carbolic acid is so great that one part of it to fifty or one hundred parts of water is sufficient for ordinary purposes. For drains, sewers, foul heaps, stables, and privies, the cheap "dead oil" of coal tar or the crude carbolic acid answers every purpose when freely applied. Coal-tar itself is available as a disinfectant to paint upon the walls of stables, privy vaults and drains. By mixing with sawdust or dry lime, coal-tar or crude acid may be used on foul grounds or heaps of refuse.—7. Boiling or high-steam heat.—Whenever foul clothing and infected things can be boiled, or have a boiling heat steadily applied and kept up for an hour, this is one of the simplest and best modes of disinfection. But until such high heat is actually applied to the infected things, some one of the disinfecting solutions must be used. A common steam tub (in a laundry or elsewhere) with a tight cover is a good disinfecting vat.

First—Things that should be disinfected are: Beds, bedding and upholstered stuffs. Expose to sunlight and ventilation freely and frequently. If actually infected, thoroughly moisten every part with best solution of 6 or 5. Second—Soiled clothing, etc., from the sick with cholera or any contagious disease. Use solution 5 or 6 precisely as directed, and as soon as the soiled articles are removed from the patient; or immerse them at once in boiling water. In any case of infectious disease the clothing must be boiled previous to washing or drying. Infected clothing must be thrown into the water at boiling heat, and that temperature should be kept up for an hour. Third—Carpets, sofas, lounges, mattresses, floors, etc., infected by cholera excrement or small-pox and other contagions:—1. Thoroughly moisten every infected thing with one of the carbolic or permanganate solutions (No. 5 or 6).—2. To give still greater completeness to the disinfection required for an infected apartment and thick woollen stuffs, carpets, etc., to which boiling heat cannot be applied, fumigate with sulphurous acid, thus:—3. Arrange to va-

cate the room for twelve hours; close every window and aperture, and upon an iron pipkin or kettle with legs, burn a few ounces of sulphur. Instantly after kindling it every person must withdraw from the place, and the room must remain closed for succeeding eight hours. If any other kind of fumigation is resorted to (as that by chlorine, bromine or nitrous acid,) a sanitary officer or a chemist should superintend the process. Fumigation should be resorted to in dwelling houses only by official orders or permission, as the disinfecting gases are very poisonous. Fourth—Finally let fresh air and sunlight purify every place they can reach. Open and dry all cellars and vaults, and keep the grounds and surfaces about dwellings as dry and clean as possible. Use fresh lime or the "calx powder" freely upon wet or offensive surfaces. Flush the water-closets and drains daily before throwing in the disinfectants as directed. Let domestic and personal cleanliness be everywhere observed. There are no substitutes for fresh air and water.

DISINFECTANTS, other.—1. One of the best and most pleasant disinfectants is coffee; the simplest way to use it is to pound the well-dried raw beans in a mortar and strew the powder over a moderately heated iron plate. The simple traversing of the house with a roaster containing freshly-roasted coffee will clear it of offensive smells.—2. The onion is a superior disinfectant. Two or three good-sized ones, cut in halves, and placed on a plate on the floor, absorb the noxious effluvia, etc., which are generated in the sick-room, in an incredibly short space of time. They should be changed every few (say 3) hours.

DIPHTHERIA.—1. A French medical journal gives the following particulars of a case of diphtheria that was cured by ice: The patient was a woman of twenty-four, who had just been confined. She complained of sore throat, could hardly swallow, and her tonsils, uvula, palate, and adjacent parts were covered with an extremely adventitious membrane; the sub-maxillary ganglions were swollen and painful, and a short cough was occasionally heard. After trying some other remedies, ice was prescribed. During seven hours the patient constantly kept a bit of ice in her mouth; it gave her pleasure, and she felt that it eased her considerably. In the course of that time, the membranes had nearly disappeared entirely, the pulse had fallen from eighty to seventy-six, and the general state of the patient had improved. In the course of the following day the cure was complete.—2. Take a common tobacco pipe, place a live coal in the bowl, drop a little tar upon the coal, draw the smoke into the mouth, and discharge through the nostrils.—3. A simple and successful treatment of diphtheria may be found in the use of lemon juice. Gargle the throat freely with it at the same time swallowing a portion, so as to reach all the affected parts. A French physician claims that he saved his own life with this pleasant remedy.

DISEASES OF CHILDREN.—Children might be saved a great many kinds of disease, if proper care was given them. By this I do not mean that mothers should wear themselves out in waiting upon them—that is what they do now—but that they should give them the right kind of care.

In the first place, their young lungs must have pure air, and enough of it. Their sleeping-rooms should be well ventilated, and they should

be out of doors as much as possible. The next thing is to clothe them warmly, so that they can be out of doors, safely and comfortably. Put flannel next their skin; let them wear high dresses, moderately long; woolen stockings and worsted drawers in winter, and cotton in summer; thick shoes, long sleeves, etc. If they do not look quite so pretty for it now, they will repay you in good looks and good health when they are older.

Keep their skin clean and active, by frequent baths; not exposing them to the air immediately after bathing, unless it is to have a good run. Give them plain, simple, nourishing food, plenty of it; but not too much, nor at irregular times. Stuffed children always have a bowel complaint, as they must. Give them plenty of sleep, too, and have them go to bed always by a certain early hour. Treat them kindly but firmly. Do not disturb their digestion with cross humors, nor allow them to do so themselves. Only by habits of obedience can they be made either healthy or good. Do not give young children tea, or coffee, or liquors. They do not need them, and are better without them.

DISEASE IN CHILDREN, Signs of.—In the case of a baby not yet able to talk, it must cry when it is ill. The colic makes a baby cry loud, long, and passionately, and shed tears—stopping for a moment and beginning again.

If the chest is affected, it gives one sharp cry, breaking off immediately, as if crying hurt it.

If the head is affected, it cries in sharp, piercing shrieks, with low moans and wails between. Or there may be quiet dozing, and startings between.

It is easy enough to perceive, where a child is attacked by disease, that there has some change taken place; for either its skin will be dry and hot, its appetite gone; it is stupidly sleepy, or fretful and crying; it is thirsty, or pale and languid, or in some way betrays that something is wrong. When a child vomits, or has a diarrhea, or is costive and feverish, it is owing to some derangement, and needs attention. But these various symptoms may continue for a day or two before the nature of the disease can be determined. A warm bath, warm drinks, etc., can do no harm, and may help to determine the case. On coming out of the bath, and being well rubbed with the hand, the skin will show symptoms of rash, if it is a skin disease which has commenced. By the appearance of the rash, the nature of the disease can be learned. Measles are in patches, dark-red, and come out first about the face. If scarlet fever is impending, the skin will look a deep pink all over the body, though most so about the neck and face. Chicken-pox shows fever, but not so much running at the nose, and appearances of cold, as in measles, nor is there as much of a cough. Besides, the spots are smaller, and do not run much together, and are more diffused over the whole surface of the skin; and enlarge into little blisters in a day or two.

DIZZINESS.—This may come from dyspepsia, over exertion, or any derangement of the circulation. Avoid the cause, and keep the feet warm, and the head cool.

DRINKING IN SUMMER.—If very thirsty sip, do not gulp, especially if drinking iced water. The sudden deaths while drinking frequently recorded in summer, are due to para-

lysis of the stomach, produced by drenching it suddenly with iced water. By sipping thirst is more thoroughly quenched and less water is needed; for in all seasons the quantity taken is an important matter, nearly as important as the temperature.

DRUNKENNESS, Remedies for.—1. Whoever makes the attempt to abandon spirit-drinking, will find, from time to time, a rankling in the stomach, with a sensation of sinking, coldness and inexpressible anxiety. The following tonic will help restore the vigor of the stomach. Take of gentian root, $\frac{1}{2}$ ounce; valerian root, 1 drachm, best rhubarb root, 2 drachms; bitter orange peel, 3 drachms; cardamon seeds, $\frac{1}{2}$ an ounce, and cinnamon bark 1 drachm. Having bruised all the above together in a mortar (the druggist will do it, if requested), pour upon it $1\frac{1}{2}$ pints of boiling water, and cover up close; let it stand till cold; strain, bottle, and cork securely; keep in a dark place. Two tablespoonfuls may be taken every hour before meals, and half that quantity whenever the patient feels that distressing sickness and prostration, so generally present for some time after alcoholic stimulants have been abandoned.—2. Sulphate of iron, 5 grains; magnesia, 10 grains; peppermint water, 11 drachms; spirits of nutmeg, 1 drachm; twice a day.

DRUNKARDS, To Reform.—Tartar emetic, eight grains, rose water, four ounces, mix. Put a tablespoonful into the whole quantity the man drinks through the day, and let him take it as usual; be sure not to exceed this quantity. Another cure is to compel the patient to drink nothing but strong spirits for a week; he will be thoroughly disgusted.

DYSENTERY.—This is an inflammation of the mucous membrane lining the lower bowels. The rectum, or lowest bowel, is generally the part most affected. The disease comes on with lassitude, shivering, a hot skin, and quick pulse. These are followed by griping pains in the bowels, and a constant desire to pass their contents. In general, the passages are small, composed of mucus mixed with blood, and are attended with griping and straining; and sometimes by nausea and vomiting. The natural feces pass off in small, round, hard lumps. The mucous discharges are at first without much smell, but as the disease increases become very offensive in odor. The disease is caused by sudden changes from hot to cold, by which the perspiration is suddenly checked. Hot weather and indigestible food may produce it.

DYSENTERY, Cures for.—Tincture of rhubarb, tincture of capsicum, tincture of camphor, essence of ginger and laudanum, equal parts; mix, shake well, and take from ten to twenty drops every thirty minutes until relief is obtained. This is a dose for an adult. Half the amount for a child under twelve years of age.—2. Take some butter off the churn, immediately after being churned, just as it is, without being salted or washed; clarify it over the fire like honey. Skim off all the milky particles when melted over a clear fire. Let the patient (if an adult) take two tablespoonfuls of the clarified remainder, twice or thrice within the day. This has never failed to effect a cure, and in many cases it has been almost instantaneous.—3. In diseases of this kind, the Indians use the roots and leaves of the blackberry-bush—a decoction

of which in hot water, well boiled down, is taken in doses of a gill before each meal, and before retiring to bed. It is an almost infallible cure.

—4. Beat one egg in a teacup; add one tablespoonful of loaf sugar and half a teaspoonful of ground spice; fill the cup with sweet milk. Give the patient one tablespoonful once in ten minutes until relieved.—5. Take one tablespoonful of common salt, and mix it with two tablespoonfuls of vinegar and pour upon it a half-pint of water, either hot or cold (only let it be taken cool.) A wine-glass full of this mixture in the above proportions, taken every half-hour, will be found quite efficacious in curing dysentery. If the stomach be nauseated, a wine-glass full taken every hour will suffice. For a child, the quantity should be a teaspoonful of salt and one of vinegar in a teacupful of water.

DYSPEPSIA.—This disease, from which so many suffer, and which is caused in so many various ways, gives the physician a great amount of trouble. Its symptoms are now so well known as hardly to need description; and they vary so much according to the stage or cause of the disease, that it is difficult to give them in a small space. Most often there is a sensation of tightness or weight in the stomach, after meals, a changeable appetite, flatulency, acidity of stomach, general distress and nervousness, and sometimes vomiting. A feeling of sinking and emptiness in the stomach is also one of its signs, and a weakness so great at that particular spot, that it is hard to sit up straight. The tongue is coated white, and there is a bad taste in the mouth, occasional heartburn, headache, palpitation, and tenderness at the pit of the stomach. The urine is high-colored, and bowels irregular. Sometimes the nervous system becomes so affected by long-continued indigestion, as to produce a complication of disorders very difficult to cure.

The causes are insufficient mastication of food, too highly-seasoned food, and sedentary habits, as well as anxiety of mind.

The treatment should, in the first place, remove the cause. The bowels should be kept open, the quantity of food taken should be rather small, and well chewed, nothing exciting to the stomach should be taken into it, and out-door exercise should be taken, but not too soon after meals. For removing costiveness, give a preparation of rhubarb and bicarbonate of potassa. For acidity, prepared charcoal, in teaspoonful doses, may be used. A good remedy is pulverized guaiacum, rhubarb, and prepared charcoal, equal parts, in teaspoonful doses. Too much brain-work must not be done, and the spirits should be kept cheerful, and the body active. Nothing is better for digestion than laughter. A remedy that has effected a cure is to take a piece of rennet, the size of a dollar, and soak in a cup of water. Give one great spoonful three times a day. This simple preparation has effected a complete cure, after trying every thing else, to no purpose, for several years.

EAR-ACHE, Remedies for.—Generally heat is the best remedy. Apply a warm poultice or warm oil to the ear. Rub the back of the ear with warm laudanum. In case of a fetid discharge, carefully syringe the ear with warm milk and water. In all cases keep the ear thoroughly cleansed. Relief is often given by rubbing the back of the ear with a little hartshorn and water.

—2. Drop some warm glycerine into the ear by

means of a quill, and afterwards introduce a piece of wool. Wool plucked from a blanket is the most suitable; the fibres are elastic, and do not coalesce into a hard pellet as cotton is apt to do.

EAR, To Remove Insects that have Entered it.—Let the person, under this distressing circumstance, lay his head upon a table, the side upwards that is afflicted; at the same time, let some friend carefully drop into the ear a little sweet oil, or oil of almonds. A drop or two will be sufficient, which will instantly destroy the insect and remove the pain, however violent. Then syringe with warm water.

EAR, To Remove Foreign Bodies from.—Dr. Hutchinson, in the London Medical Times, says the safest and most effective way of removing all foreign substances from the ear, is to make six inches of very fine and flexible wire into a loop, pass it down to the tympanum, and turn it gently around. He thinks it far preferable to the scoop or to syringing.

ERYSIPELAS.—This is an inflammation of the skin, affecting only a portion of the body's surface, and is accompanied by fever, which is thought to be contagious. The local inflammation spreads; it is deep, and attended by swelling, burning, and tingling heat; and by a redness which disappears when the skin is pressed by the finger, and returns on remitting the pressure. —**Symptoms.**—Chilliness and shaking, followed by heat; depression of spirits; weariness, pains in the back and limbs and in the head; quick, hard pulse, thirst, loss of appetite, tongue coated white, bitter taste in the mouth, nausea, vomiting, pain in the stomach, and costiveness. These symptoms appear several days before the local inflammation; they increase with the redness of the skin, and disappear upon its decline. The nervous system is very much affected, and a low delirium comes on. When the inflammation subsides, the bowels relax, and the scarf-skin peels off. Sometimes matter forms under the skin, and occasionally mortification takes place. The face is generally the seat of the disease; and it commonly begins on one side of the nose, and spreads over that side of the face, closing up the eye, and disfiguring the features shockingly. In from three to five days small blisters are discernible on the inflamed parts, which increase in size until they break and discharge the water. The disease runs about nine days, when the blisters dry, and the skin peels off.—To cure keep the patient in bed, on a low diet,—bread and water—the nearer a starvation diet the better, keeping the inflamed part of the face or other part of the body covered by soft linen cloths, wrung out of cool water and changed every half hour or hour. A poultice made of cranberries, pounded fine, and applied in a raw state has been recommended.

EMISSIONS, Involuntary.—An involuntary emission of semen during sleep, inducing great emaciation and debility.—**Treatment.**—Abstain from all sexual indulgence and lascivious ideas or books, sleep on a hard bed, use the cold bath daily, with a generous and nourishing diet. Chalybeate water and all the different preparations of iron, with the cold infusion of bark and elixir of vitriol, as directed for indigestion, should be freely employed.

EPILEPSY.—This is a disease characterized by a sudden loss of consciousness, strong spasms, and intervals between the fits. The attack is

sudden, and the patient falls down, sometimes with a cry, sometimes in silence; either with convulsions, and foaming at the mouth, or with a mere suspension of consciousness. In a short time the struggles cease, if there be any, and the patient seems to sleep, after which he recovers, and is apparently well.—*Treatment*.—Very little can be done for the patient during the fit, except to protect him from injuring himself by the violence of the convulsions. A piece of leather or cork should be placed between the back teeth to prevent the tongue being bitten. Remove the neck-cloth and collar; and if the bowels are suspected to be overloaded, give an injection. The treatment during the intervals must depend on the cause. If it be worms, expel them; if difficult breathing, lance the gums; if by uterine disturbance, search out the nature, and treat accordingly; if the complaint arise from indigestible food, great attention must be given to diet and the general health. Regular habits, and light, digestible and nourishing food, are very important. The bowels must be kept regular by the food if possible; if not, by mild laxatives. Tonics must be given, and some strengthening liniment rubbed upon the spine daily.

EXCORIATION.—Young children are very apt to be chafed under the arms, behind the ears, between the thighs, and in the wrinkles and folds of the skin, unless great attention is paid to cleanliness and wiping the skin perfectly dry after washing. Whenever there is a tendency to excoriations of this kind, either in adults or children, a little finely powdered starch, or violet powder, applied by means of a puff, or a small bag of muslin, once or twice a day, will generally remove them, and prevent their occurrence in future. See also "Chafing".

EYE-SIGHT, To Preserve.—1. Never sit for any length of time in absolute gloom, or exposed to a blaze of light. The reason on which this rule is founded proves the impropriety of going hastily from one extreme to the other, whether of darkness or of light, and shows us that a southern aspect is improper for those whose sight is weak and tender.

2. Avoid reading small print, and straining the eyes by looking at minute objects.

3. Do not read in the dusk, nor, if the eyes be disordered, by candle-light.

4. Do not permit the eyes to dwell on glaring objects, more particularly on first waking in the morning; the sun should not of course be suffered to shine in the room at that time, and a moderate quantity of light only should be admitted. For the same reasons, the furniture, walls, and other objects of a bed-room should not be altogether of a white or glaring color; indeed, those whose eyes are weak, would find considerable advantage in having green for the furniture, and as the prevailing color of their bed-chambers. Nature confirms the propriety of this direction, for the light of the day comes on by slow degrees, and green is the universal color she presents to our eyes.

5. Those individuals who are rather long-sighted should accustom themselves to read with the book somewhat nearer to the eye than what they naturally like; while others, that are rather short-sighted, should use themselves to read with the book as far as possible. By these means, both will improve and strengthen their sight, while a contrary course increases its natural im-

perfections. It is well to read or sew with the light above or behind, rather than in front of the face, or with a shade to protect the eyes from glare.

EYES, To Judge when they require the Assistance of SPECTACLES.—1. When we are obliged to remove small objects to a considerable distance from the eye in order to see them distinctly.

2. If we find it necessary to get more light than formerly, as, for instance to place the candle between the eye and the object.

3. If, on looking at, and attentively considering a near object, it fatigues the eye and becomes confused, or if it appears to have a kind of dimness or mist before it.

4. When small printed letters are seen to run into each other, and hence, by looking steadfastly on them, appear double or treble.

5. If the eyes are so fatigued by a little exercise, that we are obliged to shut them from time to time, so as to relieve them by looking at different objects.

When all these circumstances concur, or any of them separately takes place, it will be necessary to seek assistance from glasses, which will ease the eyes, and in some degree check their tendency to become worse; whereas, if they be not assisted in time, the weakness will be considerably increased, and the eyes be impaired by the efforts they are compelled to exert.

EYE, (Black) How to cure.—Immediately after the eye has been struck with force enough to make it black, apply a cloth wet with water just as hot as you can bear it; keep on applying the water for fifteen or twenty minutes, and the coagulated blood will become thin and pass off into its natural channels, and leave the eye perhaps swollen, but clear of blackness.

EYE (Sty, in) To cure.—Put a teaspoonful of soda in a small bag, pour on it just enough boiling water to moisten it, then put it on the eye pretty warm, keep it on all night, and in the morning the sty will most likely be gone; if not, a second application is sure to remove it.

EYE, (Weak and Sore) Remedies for.—1. Sulphate of zinc three grains, tincture of opium ten drops, water two ounces. To be applied three or four times a-day.—2. Take an egg and roast it after which remove the shell, then half it, take the yolk out and fill the cavities left in the whites with finely pulverized alum. Place in a thin cloth and press all the juice out. Bottle the liquid thus obtained, and bathe the eyes with it. For ordinary sore eyes it is an excellent remedy.—3. Table salt and white vitriol, of each, 1 table-spoon; heat them upon copper or earthen until dry; the heating drives off the acid or biting water called the water of crystallization, making them much milder in their action; now add to them soft water, $\frac{1}{2}$ pt.; putting in white sugar, 1 table-spoon; blue vitriol a piece the size of a common pea. If it should prove too strong in any case, add a little more soft water to a vial of it. Apply it to the eyes 3 or 4 times daily.—4. Bathe the eyes night and morning with tepid water, and then use the following lotion:—Oxide of zinc, 1 drachm; rose water, 8 ounces. Mix. If the eyelids stick together in the morning a little weak citrine ointment slightly warmed should be applied at bedtime to the edges of the lids with a feather or the tip of the finger.—5. An alum lotion is beneficial to weak and watery

eyes. It may be made by mixing half a drachm of purified alum with six ounces of rose-water.—6. Sulphate of iron, 2 grains; tincture of opium, 1 drachm; 1 pint rose-water, 2 ozs.; mix. Put a drop or two in the eye 2 or 3 times daily.—7. Sulphate of iron, acetate of lead, and rock salt, of each $\frac{1}{2}$ oz.; loaf sugar, 1 oz.; soft water, 12 ozs.; mix without heat, and use as other eye water.—8. Sulphate of iron, 1 oz.; sugar of lead, $\frac{1}{2}$ oz.; precipitated carbonate of iron, $\frac{1}{2}$ oz.; salt, and sugar, of each 1 table spoon; the whites of 2 eggs; soft water, 32 ozs.; mix the whites of the eggs, stir salt, loaf sugar, and iron well together, then add the water.—9. When extremely inflamed. Produce by boiling a handful of hops in water, getting in from $\frac{1}{2}$ to 1 dr. of opium, while boiling; when still warm, lay the hops over the eyes and keep them wet with the water in which they were boiled.—10. If sore eyes stream with water, put a little of the oxide of zinc into a bowl of water, and use it rather freely—it will soon cure them difficulty.—11. Castile soap, scraped fine, and half the quantity of very finely powdered chalk; wet them up to a paste with strong juice of lemons; when desired to apply to the eye, drop two or three drops of brandy into the box of paste; then take out a bit of it where the brandy was dropped, equal in size to the fourth of a grain of wheat, to the diseased eye; wet it on a bit of glass, and put it into the eye with a camel's hair pencil.—12. *Salve.* Take white precipitate, 1 tea-spoon and rub it into a salve with 3 tea-spoons of fresh lard, and applied upon the outside of the lid of the worst chronic (long continued), sore eyes, has cured them when they were so bad that even the eye-lashes, (lids), had fallen out, from the disease.

FAINTING.—Place the patient upon the back, with the head low; let fresh air into the room instantly, and apply gentle friction. Apply camphor or spirits of hart-horn upon the forehead, and about the nostrils.

FEET, Care of.—Many are careless in the keeping of the feet. If they wash them once a week, they think they are doing well. They do not consider that the largest pores of the system are located in the bottom of the foot, and that the most offensive matter is discharged through the pores. They wear stockings from the beginning to the end of the week without change, which becomes wholly saturated with offensive matter.—If health is generated by such treatment of the feet. The pores are not repellants, but absorbents, and this fetid matter, to a greater or less extent, is taken back into the system. The feet should be washed every day with pure water only, as well as the armpits, from which an offensive odor is also emitted, unless daily abolition is practiced. Stockings should not be worn more than a day or two at a time. They may be worn one day, and then aired and sunned, and worn another day, if necessary.

FEET, BLISTERED.—To cure blistered feet from long walking, rub the feet, at going to bed, with spirits mixed with tallow.

FEET, Cold.—The best method of averting coldness in the feet and lower limbs is to wear two pairs of stockings of different fabrics, one of silk or cotton, and the other of wool; the two fabrics serving to keep in the natural heat of the feet.

FEET, (Cold) at Bed-Time.—Draw off the stocking, just before undressing, and rub the

ankles and feet with the hand as hard as can be borne for 5 or 10 minutes. This will diffuse a pleasurable glow, and those who do so will never have to complain of cold feet in bed. Frequent washing and rubbing them thoroughly dry with a linen cloth or flannel, is useful for the same purpose.

FEET, Frost.—To relieve the intense itching of frost-bitten feet, dissolve a lump of alum in a little water, and bathe the part with it, warming it before the fire. One or two applications are sure to give relief.

FEET, Tender.—Wear woollen socks or stockings, and change them frequently. Bathe both your feet and lower limbs in a solution of common salt, a pound of salt to a gallon of water. When spring water is used, add a tablespoonful of carbonate of soda to every pint of water. Use boots or shoes with soft leather uppers, and soles not too thin.

FELON, Cure for.—As soon as the disease is felt put directly over the spot a fly blister, about the size of your thumb nail, and let it remain for six hours, at the expiration of which time, directly under the surface of the blister may be seen the felon, which can be instantly taken out with the point of a needle or a lancet.—2. Take equal quantities of soft-soap and quick-lime, mix till about the consistency of putty, make into little balls, and as often as one dries apply another; they will need to be changed about every half hour, and will be increasingly painful with each successive change, but in three or four hours the suppuration will be complete, and the felon all drawn out, leaving a little hole running to the bone, which will soon heal up, needing only to be washed daily with Castile soap and warm water, and kept covered with adhesive plaster. Hard-soap may be dissolved in warm water and used instead of soft, but soap made of woodashes is best.—3. A poultice of onions, applied morning, noon and night, for three or four days, will cure a felon.—4. Insert the finger or thumb, whichever the case may be, into a lemon, in the first stages of the disease, and keep it on twelve to twenty-four hours, and it will relieve the pain and cure without any further trouble.—5. Take equal parts of gum camphor, opium, castile soap, brown sugar; wet to a paste with spirits of turpentine, and apply like a salve. Those who have tried it say it is an invaluable remedy.—6. Take common rock salt, such as is used in salting down beef or pork, and mix with spirits of turpentine in equal parts, and as it gets dry put on more, and in twenty-four hours you are cured.—7. When you fear a felon is coming, put a pint tin of boiling water on the stove; then add to that a teaspoonful of saleratus and a wineglass of vinegar; heat this every little while, say from half an hour to an hour, and hold your finger in it till the pain subsides; repeat this till you see all the matter drawn to one place; then have it opened and your finger will heal.

FEVER and AGUE.—This, the true intermittent fever, comes on with an ague-fit, which has three stages—the cold, the hot, and the sweating. In the first stage, the patient yawns, stretches, feels weak, has no appetite, and does not wish to move. The face and extremities become pale, the skin shrinks, and is covered with goose-flesh; the patient shakes, and his teeth chatter. Then, after a time, these symptoms decline, and the patient's fever comes on very violently, and

uncomfortable sensations. As the fever progresses, the sweating stage comes on, respiration is generally profuse; the heat to its natural temperature, the pains diminish, and a feeling of health comes generally a voracious appetite. There is regularity in the time of coming on, of the ague-fits, though usually they recur each day in appearing. In this malarial fever is very much oppressed with chill from the surface, and often the bowels are enlarged as to be plainly felt by the patient is a malarious disease.—*Treatment.*—The bowels may be opened with a gentle cathartic, as salts and senna. In the cold stage, and stimulating drinks, use foot-baths, etc., and try every expedient to relieve the patient. In the hot stage, give cooling drinks, administer quinine mixture, as follows: quinine, one scruple; alcohol, one ounce; sulphuric acid, five drops. Mix and administer every half-hour during the same time giving five-drop doses of quinine every hour. When the sweating stage comes on, stop the veratrum, and rub the dry towels. In the intermission

In mild cases, other tonics than quinine will effect a cure. The nursing of the patient, bathing, sweating and rubbing are important parts of the treatment, in this and other diseases. In ague districts, the evening air, are to be avoided.

And AGUE, Other Remedies for.—Purges of gum camphor and enclose in a bag about four or five inches long, stop the bag over the pit of the stomach, by means of a cord around the neck, and the cure will be effected. When the sweating stage is gone.—2. Gerson's, as appears from medical journals, is a tincture of the leaves of the lobelia, or Australian gum-tree, to relieve intermittent fever. Dr. Lorimer cured three patients, of whom forty-three were completely cured.—3. The ordinary method of planting a house, will free the patient from the animal and vegetable miasma contained in the miasma produced by the ague.—4. See also "Quinine, a new remedy," on page 81.

Bilious Remittent.—This makes its appearance in a sudden and marked manner. There are no other symptoms except, perhaps, a general debility, slight headache, and a dry mouth, sometimes some pain in the stomach.

Its commencement is with a chill, followed by a fever, sometimes severe and prolonged. It may begin in the feet, or shoulders, running thence like streams of fire. There is seldom more than this one stage coming on afterward without the fever. At certain periods of the day, there is a remission of the symptoms, and possibly a high fever. Between these remissions, the disease seems to subside, but there is still some fever. In the ague, it does not go entirely off. In the hot stage the pulse is up to one hundred, or still higher, and there is a dryness of the head, back, and limbs, of the kind. The tongue is covered with a white fur, and, in bad cases, is parched almost black in the center, and red

at the edges. The appetite is gone, and there is generally nausea and vomiting, and pain or tenderness in the upper part of the bowels. At first there is costiveness, but afterward the bowels become loose, and the evacuations are dark and offensive. This disease is produced by malaria, and prevails in hot climates, and in our summer and autumn.—*Treatment.*—In the very beginning, the disease may be arrested by an emetic of lobelia or ipecac, followed by a mild cathartic. But if the disease is fully developed, sponge the body all over, several times a day, with water, and give cooling drinks, such as cream tartar, two scruples, in a quart of water, lemonade, etc. To allay the fever, give tincture of veratrum viride, in ten-drop doses. Cold water and ice may be given the patient, if desired. Cool the head, when it aches, with cold applications, and put a mustard-poultice on the stomach, if tender. During the remissions between the fever, quinine, and other tonics, must be given, as in fever and ague.

FEVER, Congestive.—Another form of malarious fever, is the congestive. It may be either remittent, that is, abating considerably; or intermittent, that is, having intervals of entire freedom from fever. It may have intervals of twenty-four or of forty-eight hours. The first attack does not differ from that of a simple intermittent, and may excite but little attention; but the second is always severe, producing great coldness, and a death-like hue of the face and extremities. The advancement of the disease brings dry, husky, parched, and pungently hot skin, followed after a time, by a cold, clammy sensation. The eyes are dull, watery, and sometimes glassy; the countenance dull, sleepy, distressed; the tongue, at first white, changes to brown or black, and is usually tremulous; the breathing is hurried and difficult. Pressure over the liver, stomach, or bowels, produces pain. The mind is often disturbed, and falls into lethargy and stupor, or is delirious.—*Treatment.*—This should be nearly the same as in bilious remittent. While convalescing, the diet must be light and nutritious at first, increasing in quantity as the strength returns. Use a mild tonic, if the patient is weak. Exercise out of doors must not be neglected.

FEVER, HAY (or Asthma).—This very peculiar disease appears generally as a severe attack of catarrh, with asthmatic symptoms superadded. The lining membrane of the eyes, nose, throat, and lungs is all more or less affected. The patient suffers from headache, sometimes severe, sneezing, irritation of the nose and throat, with a dry harassing cough. The asthmatic attacks come on generally towards evening, and last from one to three hours causing great distress. Hay fever is not a very common complaint, and only attacks those persons who from some peculiarity of constitution are susceptible to the causes producing it. It is supposed to be caused by the inhalation of the pungent aroma of spring grass and hay, but the inhalation of the powder of ipecacuanha will also produce it in certain individuals. In the United States, where the rose is largely cultivated, similar attacks sometimes occur; it is then called rose fever or rose catarrh. The best treatment is change of air, to the seaside if possible. During the attacks antispasmodics, such as sal volatile, ether, or an emetic, if the patient is able to bear it, inhalations of hot steam medicated with creosote, carbolic acid, or

turpentine will be found useful. When the attack passes off the general health should be improved by tonics, diet, etc.

FEVER, SCARLET.—This is an acute inflammation of the skin, both external and internal, and connected with an infectious fever.—*Symptoms.*—The fever shows itself between two or ten days after exposure. On the second day of the fever the eruption comes out in minute pimples, which are either clustered together, or spread over the surface in a general bright scarlet color. The disease begins with languor, pains in the head, back, and limbs, drowsiness, nausea and chills, followed by heat and thirst. When the redness appears the pulse is quick, and the patient is restless, anxious, and often delirious. The eyes are red, the face swollen, and the tongue covered in the middle with white mucus, through which are seen elevated points of extreme redness. The tonsils are swollen, and the throat is red. By the evening of the third or fourth day the redness has reached its height, and the skin becomes moist, when the scarf-skin begins to come off in scales.

In this fever the flesh puffs up so as to distend the fingers, and disfigure the face. As it progresses the coating suddenly comes off the tongue, leaving it and the whole mouth raw and tender. The throat is very much swollen and inflamed, and ulcers form on the tonsils. The eustachian tube which extends up to the ear, the glands under the ear and jaw, some times inflame and break; and the abscesses formed in the ear frequently occasion deafness more or less difficult to cure. The symptoms of this disease may be distinguished from that of measles by the absence of cough; by the finer rash; by its scarlet color; by the rash appearing on the second instead of the fourth day; and by the ulceration of the throat.—*Treatment.*—In ordinary cases the treatment required is very simple. The room where the patient lies should be kept cool, and the bed-covering light. The whole body should be sponged with cool water as often as it becomes hot and dry, and cooling drinks should be administered. If there is much fever and soreness of throat, give cold water to drink and apply cloths, wrung out of ice water. It would also be useful to commence treatment with an emetic; and to soak the feet and hands in hot water containing a little mustard or cayenne pepper; continuing this bath twenty minutes, twice a day, for two or three days. The cold stage being passed, and the fever having set in, warm water may be used without the mustard or pepper. If the head is affected, put drafts upon the feet; and if the bowels be costive, give injections of warm water. Solid food should not be allowed; but when the fever sets in, cooling drinks, such as lemonade, tamarind-water, rice-water, flaxseed-tea, thin-gruel, or cold water may be given in reasonable quantities.

FEVER, TYPHOID.—Typhoid fever is generally preceded by several days of languor, low spirits and indisposition to exertion. There is also, usually, some pain in the back and head, loss of appetite, and drowsiness, though not rest. The disease shows itself by a chill. During the first week there is increased heat of the surface, frequent pulse, furred tongue, restlessness and sleeplessness, headache and pain in the back; some times diarrhoea and swelling of the belly, and sometimes nausea and vomiting. The second

week is often distinguished by small, rose-colored spots on the belly, and a crop of little watery pimples on the neck and chest, having the appearance of minute drops of sweat; the tongue is dry and black, or red and sore; the teeth are foul; there may be delirium, and dullness of hearing; and the symptoms every way are more serious than during the first week. Occasionally, the bowels are at this period perforated or ate through by ulceration, and the patient suddenly sinks. If the disease proceeds unfavorably into the third week, there is low, muttering delirium; great exhaustion; sliding down of the patient toward the foot of the bed; twitching of the muscles; bleeding from the bowels; and red or purple spots upon the skin. If on the other hand, the patient improves, the countenance brightens up, the pulse moderates, the tongue cleans, and the discharges look healthy.—*Treatment.*—Give the patient good air, and frequent spongings with water, cold or tepid, as most agreeable. Keep the bowels in order, and be more afraid of diarrhoea than costiveness. Diarrhoea should be restrained by injection of cold water. For costiveness, give mild injections, made slightly loosening by castor oil, or common molasses. To keep down the fever, and produce perspiration, give tincture of veratrum viride, ten drops every hour. If the bowels are swelled, relieve them by hot fomentation of hops and vinegar. If the pain in the head is very severe and constant, let the hair be cut short, and the head bathed frequently with cold water. Give light nourishment, and if the debility is great, broth will be needed. Cleanse the mouth with very weak tea—old hyson. If the fever runs a low course, and the patient is very weak, quinine may be given from the beginning. Constant care, and good nursing, are very important. Typhus fever is distinguished from typhoid by there being no marked disease of the bowels in typhus.

FEVER, YELLOW.—This disease is most prevalent in hot climates, and southern cities of our country. It comes in the latter part of summer, and lasts till frosty weather.—*Symptoms.*—The disease begins with a chill, generally not very severe. Following the chill, there is moderate fever, and some heat of the surface, but this rarely rises to any great height, and only continues to the second or third day, when, in fatal cases, it gives place to coldness of surface, etc. In many cases there is sweating. The pulse is peculiar, not often over a hundred, but feeling like a bubble under the finger, which breaks and vanishes before it can be fairly felt. The tongue is moist and white in the first and second days; but red, smooth, shining and dry as the disease advances toward the close, having a dry, black streak in the middle. The most striking symptoms are nausea and vomiting, which, in fatal cases, is very persistent, and toward the last a yellowish or greenish matter is thrown up, followed by a discharge of thin black fluid, which is called the black vomit. The bowels are generally costive, with tenderness in the upper bowels or stomach. There is generally severe headaches, and a peculiar expression of face, in which the lips smile, while the rest of the face is fixed and sad, sometimes wild. The patient continues wakeful night and day. There are discharges of blood, often from the nose, the gums, the ears, the stomach, the bowels, and the urinary passages.—*Treatment.*—First move the bowels with

some mild physic, such as sweet tincture of rhubarb, four ounces; bicarbonate of soda, two drams. Mix. Give a tablespoonful once in three hours until it operates. During the chill, use all the usual means of warming the body by hot bottles, mustard foot-bath, warm drinks, drafts, etc. A warm poultice on the stomach is useful—some would advise cupping. During the second, or *calm stage*, give gentle stimulants, warm drinks, and five-drop doses of veratrum viride, also quinine. In the third stage, brandy, quinine, and all stimulants freely. To quiet the vomiting, give of this preparation: creosote, twenty drops; spirits of mindererus, six ounces; and alcohol, enough to dissolve the creosote. Dose, half an ounce, every two hours.

Temperance, cleanliness, and all good habits, do much to prevent this disease.

FITS.—See "Epilepsy".

FOOD for BABIES.—Mothers who are not able to nurse their babies, find it almost impossible to keep the milk they are compelled to use so perfectly sweet as not to injure their little ones. Ice, if it can be had, does not wholly answer, even if its excessive cold does not change the character of the milk. A few years since the writer of this, while in a southern state, recommended the following plan to a mother: Mix your babe's food milk with its due proportion of sugar, and place the pitcher holding it in a deep plate—a souper-plate or pie-dish will do—and fill the plate with cold water. Take a piece of thin muslin, large enough to cover the whole pitcher and reach down all sides into the water. Have no cover on the pitcher, wet the cloth and cover the pitcher with it; put its ends into the water, and set the whole in a place where a draught of air will pass over it. The mother tried the plan, and during an exceedingly hot summer, through the most sultry days and nights of a long season, the milk never turned at all. The rationale of the thing is easy. The milk is not confined in a close vessel, or in danger of being tainted by nearness to other, perhaps not wholesome food; the thin gauze protects it, yet leaves it open; the draught of air keeps the temperature down by the constant evaporation, while the water is constantly sucked up by the cloth, acting like a wick in a lamp to supply the moisture.

GONORRHEA, (Clap).—A tingling sensation at the end of the penis, which swells, looks red and inflamed, followed by a discharge of matter that stains the linen, first of a whitish, then of a yellow or green color, a scalding pain in making water, involuntary and painful erection.—**Treatment.**—There are two kinds of this affection, the mild and the virulent. The first is of so trivial a nature, that plentiful draughts of any soothing liquid, as barley-water, or flax-seed-tea, with a low diet, are sufficient to remove it. The second produces effects more or less violent on different persons, and occasionally resists for months every remedy that can be thought of. If there be much pain and inflammation in the penis, apply a bread and milk poultice to it, take a dose of salts, and lose some blood. This is the more necessary if, in consequence of the swelling of the foreskin, it cannot be drawn back, or being back, cannot be drawn forward. In the meantime, take pretty large doses of the balsam copaiwa daily. A very low diet should be adhered to, and the patient should remain perfectly quiet.

GLEET.—The weeping of thin glairy fluid,

like the white of an egg, from the penis, caused by a long-continued clap.—**Treatment.**—A gleet is exceedingly difficult to get rid of, and frequently defies every effort that is made for that purpose. It must be attempted, however, by the daily use of the cold bath, and thirty drops of the muriated tincture of iron, taken three times a day, for months, in a glass of the cold infusion of bark. The best advice to be given in this case is to apply at once to an intelligent surgeon, who will prescribe injections of alum, sulphate of zinc, or nitrate of silver.

GRAVEL.—Gravel, which is a deposit of unnatural substances in the urine, is indicated by a sudden attack of pain in the region of the kidneys, so acute and severe as to frequently cause fainting, and even convulsions. The pain runs down to the groin and thigh, causing a numbness of the affected side, and a drawing up of the testicle. The pain is excessive at times, and then remits. Finally it stops suddenly. The pain is caused by the passing along the tubes which lead from the kidneys to the bladder, the stones or gravel which is found there. Sometimes the gravel is so fine as to cause no pain, and is deposited with the urine at the bottom of the vessel. The deposits are of various kinds, indicating the state of the health, and must be treated differently. But as none but a chemist or physician could determine the nature of the deposits, whether they were acid or alkaline, we will leave the treatment also entirely to them.

GOUT, To cure.—Take hot vinegar, and put into it all the table salt which it will dissolve, and bathe the parts affected with a soft piece of flannel. Rub in with the hand, and dry the foot, etc., by the fire. Repeat this operation four times in the 24 hours, 15 minutes each time, for four days; then twice a day for the same period; then once, and follow this rule whenever the symptoms show themselves at any future time. A better cure, as also an infallible preventive, is to live on bread and water alone twice a day, and earn it by hard physical labor.

HEALTH, Rules for Preserving.—1. Pure atmospheric air is composed of nitrogen, oxygen, and a very small proportion of carbonic acid gas. Air once breathed has lost the chief part of its oxygen, and acquired a proportionate increase of carbonic acid gas; therefore, health requires that we breathe the same air only once.

2. The solid parts of our bodies are continually wasting away, and require to be repaired by fresh substances; therefore, food, which is to repair the loss, should be taken with due reference to exercise and the waste of body.

3. The fluid part of our bodies also wastes constantly; there is but one fluid in animals, which is water; therefore, water only is necessary, and no artifice can produce a better drink.

4. The fluid of our bodies is to the solid in proportion as nine to one; therefore, a like proportion should prevail in the total amount of food taken.

5. Light exercises an important influence upon the growth and vigor of animals and plants; therefore, our dwellings should freely admit light.

6. Decomposing vegetable and animal matter yields various noxious gases, which enter the lungs and corrupt the blood; therefore, all impurities should be kept away from our abodes, and every precaution used to secure pure air.

7. Warmth is necessary to all the bodily functions; therefore, an equal bodily temperature should be maintained by exercise, clothing or fire.

8. Exercise warms, invigorates, purifies the body; clothing preserves the warmth the body generates; fire imparts warmth externally; therefore, to obtain and preserve warmth, exercise and clothing are preferable to fire.

9. Fire consumes the oxygen of the air, and produces noxious gases; therefore, the air is less pure in the presence of candles, gas, or coal-fire than otherwise; and the loss should be repaired by increased ventilation.

10. The skin is a highly-organized membrane, full of minute pores, cells, blood-vessels, and nerves; it imbibes moisture, or throws it off, according to the state of the atmosphere and the temperature of the body. It also breathes, as do the lungs, though less actively. All the internal organs sympathize with the skin; therefore, it should be cleansed frequently.

11. Late hours and anxious pursuits exhaust the nervous system, and produce disease and premature death; therefore, the hours of study and labor should be short.

12. Mental and bodily exercise are equally essential to health and happiness; therefore, recreation and study should succeed each other.

13. Man will live most healthily upon simple solids and fluids, of which a sufficient but temperate quantity should be taken; therefore, strong drinks, tobacco, snuff, and opium, and all mere indulgences, should be avoided.

14. Sudden alternations of heat and cold are dangerous, especially to the young and aged; therefore, the clothing should be sufficient, and adapted to changes of temperature.

15. Moderation in eating and drinking, in labor and study; recreation taken with regularity; rest, cleanliness, even temper, an equable temperature, are the great essentials of health—which far surpasses wealth in value.

HEADACHES.—Headaches are always symptoms of some derangement of the system in some of its parts, and should not be neglected. In children, they generally indicate the approach of some disease. In adults, they are occasioned frequently by a bad circulation, impaired digestion, and by affections of the nerves. For the first, active exercise, and a slight physic, are only necessary; for the second, light diet, with exercise and a dose of some bitter alkali after meals; and for the third, the same treatment as for neuralgia, being careful about the diet. Sometimes a patient is subject to rheumatic headache, which may be treated with warm fomentations, stimulating liniment, and a gentle physic. The patient should dress warmly, and avoid exposure to cold and wet feet.

HEADACHE, Remedies for.—1. A doctor in Paris has published a new remedy for headaches. He uses a mixture of ice and salt, in proportion of one to one half, as a cold mixture, and this he applies by means of a little purse of silk gauze, with a rim of gutta percha, to limited spots on the head, when rheumatic headaches are felt. It gives instantaneous relief. The skin is subjected to the process from half a minute to one and a half minutes, and is rendered hard and white by the application.—2. Put a handful of salt into a quart of water, add one ounce of spirits of hartshorn and half an ounce of camphorated spirits of

wine. Put them quickly into a bottle, and cork tightly to prevent the escape of the spirit. Soak a piece of rag with the mixture, and apply it to the head; wet the rag afresh as soon as it gets heated.—3. It is stated that two tea-spoons of finely powdered charcoal, drank in half a tumbler of water, will, in less than 15 minutes, give relief to the sick headache, when caused, as in most cases it is, by superabundance of acid on the stomach. We have tried this remedy time and again, and its efficacy in every instance has been signally satisfactory.

HEAD (Scald), in Infants.—This complaint begins in brownish spots on the head, and in a few days forms a scab, and discharges a thick, gluey matter, that sticks upon the hair. The sores gradually increase, until the whole head is covered with a scab, discharging this matter, which is very offensive. The hair is to be cut off as close as possible, and the head washed every night and morning with lime water. This is easily prepared by slacking a piece of quicklime, of the size of a hen's egg, in a quart of water, and when settled, it is to be put into a bottle and corked for use.

HEART, Palpitation of.—Palpitation and irregular action of the heart are often experienced in persons between the ages of sixteen and twenty years; they are, or have generally been, growing rapidly, are of delicate appearance, and frequently are addicted to some vicious habits. In such persons, the blood is thin and poor, and the heart and nerves fail to perform their proper function for want of support. Derangement of the stomach often gives rise to these symptoms, and they may persist for a long period from this cause. A lady who for years suffered from violent paroxysms of palpitation, which many physicians attributed to organic disease of the heart, happened on one occasion to take some medicine which induced vomiting, and this act was followed by immediate recovery. Subsequently, whenever she had the symptoms of an approaching attack of palpitation, she resorted to an emetic, which not only gave relief to the paroxysm, but finally relieved her altogether. In another case, a patient entered a hospital suffering severely from violent action of the heart; he was bled, and blistered, and purged without benefit; having taken a large dose of medicine, vomiting ensued, with immediate and permanent relief.

Tea, and especially green tea, is very liable to disturb the heart's action when used by susceptible persons. And there is no doubt that an immense number of persons in every community suffer from minor forms of heart derangement, due to the use of tea.

Tobacco, either smoked or chewed, invariably effects the heart's action, and produces irregularity and palpitation.

HEARTBURN.—Anxiety and pain about the region of the stomach, generally attended by a sense of gnawing and heat; hence called heartburn. Faintness, nausea, and eructation of a thin, acidulous, watery liquid, especially in the morning, are common symptoms of this complaint. The usual causes of heartburn are excess in eating or drinking, the use of improper food, and sedentary habits. A good remedy is a tea-spoonful of carbonate of magnesia, or carbonate of soda, in a glass of peppermint or cinnamon water, to which a little powdered ginger may be added with advantage. This dose may be taken

2 or 3 times daily until the disease is removed. Articles of food that easily undergo fermentation should at the same time be avoided, and a dry diet had recourse to as much as possible. Soda-water, toast and water, and weak spirits and water, are the most suitable beverages in this complaint.

HEMORRHAGE, Uterine, To Prevent.—Take sugar of lead, 10 grs.; ergot, 10 grs.; opium, 3 grs.; ipecac, 1 gr.; all pulverized and well mixed. Dose, 10 to 12 grs., given in a little honey or syrup. In very bad cases after childbirth, it might be repeated in 30 minutes, or the dose increased to 15 or 18 grs.; but in cases of rather profuse masting, repeat it once at the end of 3 hours, or as the urgency of the case may require.

HICCOUGH.—A convulsive motion of the diaphragm and parts adjacent. The common causes are flatulency, indigestion, acidity, and worms. It may usually be removed by the exhibition of warm carminatives, cordials, cold water, weak spirits, camphor julep, or spirits of sal volatile. A sudden fright or surprise will often produce the like effect. An instance is recorded of a delicate young lady that was troubled with hiccough for some months, and who was reduced to a state of extreme debility from the loss of sleep occasioned thereby, who was cured by a fright, after medicines and topical applications had failed. A pinch of snuff, a glass of cold soda-water, or an ice-cream, will also frequently remove this complaint.

HOARSENESS, Remedy for.—Take one drachm of freshly scraped horse-radish root, to be infused with four ounces of water in a close vessel for three hours, and made into a syrup, with double its quantity of vinegar. A teaspoonful has often proved effectual.

HYDROPHOBIA.—This terrible disease, the result of the bite of a mad dog, or mad wolf, is a disease for which there is no certain remedy. The symptoms, after being bitten, are lancinating pains in the scar of the wound, which dart toward the body, if it be a limb that was bitten. Sometimes the wound feels cold, or stiff, or numb, or grows red, swelled, or livid, and sometimes breaks open and discharges matter. The patient feels a strange anxiety, is depressed in spirits, has an occasional chill, and disturbed sleep, or spasmodic twitches. The pulse is above its natural state, both in quickness and strength, and the nervous system is very impressible. The senses are all more acute; trifling noises produce agitation, and the eyes are so disturbed by the light that the patient sometimes hides himself in a dark place; and the appetite is lost. In the second stage there is thirst; but when the patient attempts to drink, a spasmodic shudder comes over him; he pushes away the water in horror, and the awful conviction flashes over him that he is mad. After this he can not swallow fluids; has stiffness in the neck; is thrown into convulsions by the sight or sound of water, by a breath of air blowing upon him, or by a bright light. His throat is full of a viscid, glairy matter, which he continually tries to clear away. Between convulsions and exhaustion he lingers three or four days, and dies.

In regard to preventive treatment, which is so efficient, and therefore of vast importance, let it be remembered that a mere scratch on the hand or face is the most dangerous—a bite through

clothing not without danger. As the poison adheres to the part some time after the bite before it produces the effect, let the wound be instantly washed, again and again, with soap and water. If a physician were to vaccinate a child in the arm, and an hour after should wash the part with soap and water, no effect would result.

While washing is being done, send instantly to the nearest druggist for a piece of caustic potash. This comes in small cylindrical pieces. If the tooth of the dog has penetrated, cut the caustic in the shape of a pencil or a dog's tooth, insert it in the wound and hold it there firmly for a quarter of a minute without regard to the pain, which will be severe.

Caustic potash can be made extempore by pouring boiling water on wood ashes, straining out the ley, and boiling it down to the consistence of molasses. It may be applied with a smooth stick.

When the wound is a scratch, and therefore the most dangerous, wipe it over briskly with the same material. If the caustic potash cannot be procured, use nitric acid (aqua fortis) or sulphuric acid (oil of vitriol). Milder caustics, which do not destroy the surface of the wound in which the poison is lodged, are not worthy of confidence, although Mr. Youatt recommends the nitrate of silver (lunar caustic). The part may be poulticed with bread and milk for two days, and then dressed with simple salve.

It is too common a practice to kill instantly a savage dog who has bitten a person. This is exceedingly wrong, as the person lives for years with the torturing apprehension that he has been bitten by a rabid dog. The animal should be shut up and regularly fed. If rabid, he will certainly die; but if he lives a week and takes food there is no danger.

It is generally believed that canine madness occurs almost exclusively in summer, and especially during what are termed the "dog days." This is a popular error. According to the best authority, the disease is communicated only by contagion, and just as likely to be propagated in winter as in summer, and therefore city ordinances, which allow dogs to be at large at one season and not at another, are absurd. See also "Mad Dog Bites" on page 11.

INDIGESTION, Remedy for.—Half an ounce of ground Turkey rhubarb; 1 drachm of sulphate of quinine; 1 drachm of extract of sarsaparilla. Put the sarsaparilla into a cup with 3 or 4 teaspoonfuls of cold water; let it stand till dissolved; then add the other ingredients. Make it into a stiff paste; it will then be ready to make into pills with the use of a little flour. The whole costs but a small sum and makes nearly 100 pills. The dose is 2 pills every other night.

INFLUENZA.—Influenza, which, in its lighter form, is simply a cold, may become a very serious and troublesome complaint. It begins generally with a tingling and sense of fullness in the mucous membrane of the nose, making breathing through the nose difficult, and producing sneezing. The eyes become red and watery, the throat is sore, and there is a dry cough, hoarseness, thirst, lassitude, and chilliness. The mucous membrane of the nose, throat, and breathing-tubes, is red and inflamed, sometimes swollen and painful. The water runs from the eyes and nose, and the cough begins to be accompanied by expectoration of yellow matter.

Pain in the back and limbs, alternate heat and chills, and loss of appetite, accompany the disease.—*Treatment*.—A very mild treatment is required only, such as bathing the feet in warm water, sweating, drinking warm herb-teas, slippery elm, and taking a very light diet. Some slight laxative may also be given. If the disease is very severe, it may be necessary to give an emetic of the compound tincture of lobelia, or the powder of ipecac, 10 to 20 grains. If the cough is severe, give this: tincture of lobelia, half an ounce; syrup of squills, half an ounce. Mix. 20 drops four or five times a day.

INTOXICATION, Remedies for.—Among the remedies employed to remove the intoxication produced by the use of alcoholic drinks, the preparations of ammonia and the vegetable acids are the most common and important. About 2 or 3 fluid drachms of aromatic spirits of ammonia (spirits of sal volatile) mixed with a wineglassful of water will generally neutralize or greatly lessen the action of intoxicating liquors. This sometimes produces vomiting, but this is a desirable result, as nothing so effectually removes the drunken fit as the thorough removal of the liquor from the stomach: hence tickling the throat with the finger or a feather is a common resource. Soda-water acts by the free carbonic acid it contains, and serves also as a tonic to the stomach. Vinegar, among the acids, is one of the most effective remedies, a small teaspoonful being a customary dose. In the West Indies, lime juice and lemon juice are used. The use of bitter almonds, as a means of lessening or retarding the effects of fermented liquors, was known to antiquity, and is still common among heavy drinkers at the present day. See also "Drunkenness."

ITCH.—This disease is generally consequent upon personal uncleanness, yet all classes are liable to it. Its symptoms are the eruption of distinct, cone-like, watery pimples, transparent on their summits, accompanied by excessive itching, which is made worse by high-seasoned food, by drinking liquor, and by the heat of the bed. When these pimples are scratched and torn, a sticky, watery fluid is poured out, which forms small scabs; and in time, if the disease is not cured, these scabs being torn off, bad sores are made. This disease is caused by a minute insect, which forces its way into the skin, and makes cavities for its own occupation, while the victim itches and scratches in consequence.

Treatment.—To kill the insect which causes the annoyance is the way to cure the disturbance. For this purpose, the compound sulphur ointment is a sovereign remedy. Four ounces of this should be well rubbed into the skin, before the fire, morning and evening, for three or four days. Caustic potash, one part, to twelve parts of water, as a wash to be thoroughly applied, is a good remedy. Before using any application, the person should be washed with warm water and soap, and well dried. The Prussian military authorities cure itch by smearing the parts with a mixture of two parts of liquid storax with one part of sweet oil. The cure is said to be complete in twenty four hours.

ITCH, Petroleum for.—Dr. Decaisne, of Belgium, reports having used successfully the oil of petroleum in upward of six hundred cases of itch. In the great majority of cases the disease was completely cured after a single friction; in several after two, and in a very few instances

three or four applications were required. The method failed in two or three cases only, and in these sulphurate of lime was necessary to effect a cure. It is not necessary, as some military surgeons have thought, to rub in the oil with coarse towels and brushes, but on the contrary, the softest brushes should be used to spread the oil on the skin. Dr. Decaisne, from experiments instituted in the military hospital and garrison at Antwerp, on the disinfection of the clothing, believes that this process is quite unnecessary. Even if some of the germs of the itch insect should adhere to the wearing apparel, these are destroyed by the action of the petroleum with which the person of the patient is saturated.

ITCH, Barber's.—This appears on the hairy part of the face—the chin, upper lip, the region of the whiskers, the eyebrows, and nape of the neck. It consists in little conical elevations, which mature at the top, and have the shaft of a hair passing through them. These pimples are of a pale, yellowish color. In a few days they burst, and the matter running out, forms into hard, brownish crusts. These crusts fall off in one or two weeks, leaving purplish, sluggish pimples behind which disappear very slowly. The disease is thought to be caused by using a dull razor in shaving; and is very obstinate, lasting for months, or even years.—*Treatment*. The most important part of the treatment is the removal of the cause. The beard must not be pulled with a dull razor, and the shaving had better be discontinued altogether, the beard being simply cropped off with the scissors. All intemperance in eating or drinking must be avoided, as well as exposing the face to heat. A light, cool diet will do much toward a cure.

ITCH, Bakers.—This disease is of common occurrence on the hands of bakers; hence the vulgar name.—*Treat*.—Frequent ablution in warm water, keeping the bowels open with saline purgatives, and the nightly use of sulphur ointment will generally effect a cure. Salt food should be avoided as much as possible, as well as keeping the hands covered with dough and flour; the latter being the cause of the disease.

JAUNDICE.—The most prominent symptoms of this disease are, yellowness of the skin and whites of the eyes, saffron-colored urine, and whitish or clay-colored stools. An infusion of thoroughwort, drank freely every day, is a good remedy. The diet should be plain, wholesome and nourishing, composed mostly of vegetable articles. Cold water should be the only drink.

KIDNEYS, Acute Inflammation of.—The symptoms of this disease are, at first, cold chills and rigors, especially in the back and loins, followed by fever and pain. The pain frequently extends to the bladder, the loins, the thighs, and is of a severe and lancinating kind—though a little obtuse. Pressure, motion, straining, or taking a full breath, add to its pungency. The urine is scanty and high-colored, sometimes bloody, and can only be passed drop by drop. In the loins there is a sense of heat, gnawing, and constriction, and the bowels are irregular. A numbness of the thigh, and drawing up of the testicle, are marked and peculiar symptoms. In some cases there is nausea and vomiting, faintness, hiccup, distension of the bowels, which rumble, etc. The skin is dry and hot; pulse hard and frequent.—*Treatment*.—Either put the feet in a hot mustard bath, or put drafts of mustard on the feet.

Also apply the same upon the small of the back, and follow it up with hot fomentations of hops or stramonium-leaves. Induce perspiration by the use of veratrum viride, in ten-drop doses every hour. If the bowels are costive, open them with salts or cream of tartar, or, better still, by frequent and copious injections of warm water containing a few drops of tincture of arnica. The drinks must be slippery elm, flaxseed-tea, and the like cooling infusions. If the disease becomes chronic, which is indicated by weakness in the small of the back, and dull, heavy pain in the kidneys, by the small quantity of urine passed often, and its white color, use the diuretics, buchu, trailing arbutus, queen of the meadow, and open the bowels with a gentle physic, if necessary. Use the alkaline bath, daily, with friction. A mustard-poultice, two or three times a week, upon the small of the back, should be used. The diet should be very careful.

LEAD Poisoning.—M. Didierjean, a red-lead manufacturer, has discovered that the use of milk at their meals, which he has made obligatory on his workmen to the extent of one litre daily, preserves those employed in lead works free from any symptom of lead disease.

LÉECHES, To Apply.—One of the operations generally intrusted to the nurse is the application of leeches. The part to which they are to be applied should be carefully and thoroughly washed with soap and warm water, then dried, and again just moistened with fresh milk. The leeches having been put into a wineglass or tumbler (according to their number), it should be quickly inverted, and pressed firmly on the skin, so as to prevent them from escaping under the edge of the glass.

LEUCORRHEA, ("Whites.") This is the term applied to a colorless, white or yellowish discharge, secreted from either the Mucus Membrane of the Vagina or Uterus, or both. The cause which produces the Whites may have its seat either in the Vagina, or in the neck of the Womb. If it be thin and watery, or thick and cream like, it is from the Vagina; if ropy, gluey or albuminous, like white of egg, it is from the cavity of the neck. The treatment consists in strengthening the parts, by the wearing of perfectly loose clothing, hip baths, and cold water injections five or six times a day, with active friction on the back, hips and lower part of the abdomen. No sexual intercourse must be allowed while a cure is unaffected.

LIVER, Acute Inflammation of.—The office of the liver is to take the superabundant carbon out of the blood. This carbon unites with other elements, and forms bile—the peculiar bitter substance which is poured into the upper bowel, and greatly aids digestion. The liver is liable to become inflamed from several causes: such as gravel-stones, external violence, suppressed secretions, hot climates, inflammation of the duodenum, etc. The symptoms of acute inflammation of this organ are, fever, with pain in the right side, and a sense of tension, inability to lie on the left side, difficulty of breathing, a dry cough, vomiting and hiccough. The pain is generally acute and lancinating, though sometimes dull and tensile. When sharp, it is like the stitch of pleurisy, and it indicates that the peritoneum which covers the liver is inflamed. When dull, it is in the body of the liver itself. The pulse is full, hard and strong, the bowels costive, and the stools clay-

colored, owing to not being tinged with bile—this having stopped flowing. The tongue is covered with a yellow, dark-brown, or even black coat, and there is a bitter taste in the mouth.

Treatment.—It may be necessary to apply wet cups, or leeches, over the liver. Purgatives must be used pretty freely, and those which produce watery stools are the best. Senna-leaves, two drachms, steeped in a pint of water, to which is added, when cool, one ounce of Epsom salts. Strain, and give one-fourth of the preparation for a dose; this is a brisk purge. It will be necessary to blister the surface over the liver generally, though a mustard-poultice will answer in mild cases. A poultice of mustard on the spine is also of service in relieving the pain. A foot-bath friction, and sour drinks, are good. Perspiration, induced by a vapor-bath, and kept up by giving the tincture of American hellebore, from three to ten drops an hour, is excellent. When the urine is scanty and high-colored, give some diuretic, as an infusion of marshmallow-root, or the seeds of the pumpkin steeped to make a tea. The diet should be of the lightest kind, until the patient is somewhat recovered.

LIVER, Chronic Inflammation of.—This is a difficult disease to cure. Its symptoms are a sense of fullness and weight in the right side, with some enlargement, and shooting pains in the same region, especially when it is pressed, with pains in one or both shoulders, and under the shoulder-blades; uncomfortable sensation when lying on the left side; yellowness of the skin, eyes, and urine; bowels irregular, loose or costive; appetite disturbed; sometimes a dry, hacking cough; shortness of breath, tongue whitish, and brown or yellow toward the root; a bitter and bad taste in the morning. The urine deposits a sediment on standing. There is usually a low and desponding state of the mind, with irritability and peevishness of temper. The skin is often covered with yellow spots, and with a branny substance. The various symptoms of dyspepsia are present. The nervous system is apt to be disturbed, and there is a disinclination to apply the mind, or a dread of some impending evil.

Treatment.—If there is much tenderness of the liver, begin with mustard-poultices, and the compound pills of podophyllin, or the compound pills of leptandrin: podophyllin, fifteen grains; leptandrin, two scruples; cream of tartar, five scruples. Mix. Divide into ten powders. One is a dose. The compound tar-plaster is often very useful. An alternative will be found useful. The daily alkaline sponge-bath must on no account be neglected. Vigorous friction should follow it. If the constitution will bear it, it is well to vary the sponge-bath with an occasional shower-bath. The diet must be simple, yet nourishing, and embracing but a small amount of fat. But, above all, out-door exercise must be taken to the full amount of the strength, and the thoughts occupied with cheerful subjects. Avoid the hot sun, and let the summer exercise be taken in the cool of the day. The recovery from any chronic disease must necessarily be slow, therefore the patient must not be discouraged, but should persevere steadily until the benefit is felt.

LOCK-JAW.—This is a spasmodic contraction or stiffness of the voluntary muscles. Sometimes it is partial, and sometimes extends to the whole system. It is produced by exposure

to cold, by bodily injuries, or by the injury of a nerve. *Symptoms.*—There is long-continued, violent and painful cramping of the voluntary muscles. At first there is difficulty and uneasiness in turning the head, with inability to open the mouth easily—then the jaws close gradually, but with great firmness, swallowing becomes difficult, and a pain, starting from the breast bone, pierces through to the back—probably caused by cramp of the midriff. The cramps now extend to the whole body, the muscles of which continue in a state of rigid spasm till the disease yields or the patient dies. The appearance of the patient is frightful, the face being contorted, and the features set in a ghastly grin.—*Treatment.*—The only known remedy for this disease is chloroform or ether, taken either into the stomach, or by inhalation, in quantities sufficient to control the spasm—being repeated as long as the spasms occur. The costiveness must be removed by one or two drops of Croton oil, given in a spoonful of gruel.

LUNGS, How to ascertain state of.—Persons desirous of ascertaining the true state of their lungs, are directed to draw in as much breath as they conveniently can; they are then to count as far as they are able, in a slow and audible voice, without drawing in more breath. The number of seconds they can continue counting must be carefully observed; in a consumptive the time does not exceed ten, and is frequently less than six seconds; in pleurisy and pneumonia it ranges from nine to four seconds. When the lungs are in a sound condition, the time will range as high as from twenty to thirty-five seconds.

LUNGS, How to Strengthen.—Many inventions have been sought out for expanding the lungs, but the following simple means will accomplish the work as well as it can possibly be done. Go into the air, stand erect, throw back the head and shoulders, and draw the air through the nostrils into the lungs as much as possible. After having thus filled the lungs, raise your arms, still extended, and suck in the air. When we have thus forced the arms backwards, with the chest open, change the process by which you draw in your breath, till the lungs are emptied. Go through the process several times a day, and it will enlarge the chest, give the lungs better play, and serve very much to ward off consumption. If the lungs are tender, or the blood vessels weak, due care must be used at first not to over-strain them.

LUNGS, Inflammation of.—The patient lies upon his back, and has some pain in his side, some difficulty of breathing, a dry cough at first, but soon accompanied by a mixture of phlegm and blood. As the disease increases, this matter becomes more tenacious; there is increased difficulty in breathing; greater prostration; and often some delirium. In the first stage of the disease, the lungs are crowded with blood; in the second the lungs are so swelled and thickened up as to force out the air, and become solid; in the third stage, matter is found diffused through the whole substance of the lungs. The matter raised is thinner, and looks like prune-juice. From this stage persons rarely recover.—*Treatment.*—The first thing to be done is to give an emetic, either of compound powder of lobelia, tartrate of antimony, or pulverized ipecac. The next thing is to produce sweating by the same means as in pleurisy. If there is much fever,

and a rapid pulse, it is better to give tincture of veratrum viride, every hour, in from three to ten-drop doses, for the purpose of sweating. Mustard-plaster on the chest, to be put on, and taken off several times, and when the surface grows sore, it must be changed to another, so as to affect the chest extensively.

Open the bowels with a preparation of salts, or magnesia. Give the patient for drinks flaxseed or slippery elm tea, and let the diet be barley-water, lemonade, Indian-meal gruel, very thin, crust-coffee, etc. As the fever abates, the cough will need attention. To quiet this, give Tartar emetic, one grain; boiling water, ten drams. Mix. Take one teaspoonful every hour. When the fever is gone, if the patient is feeble and low, give tonics, such as compound infusion of gentian, eight ounces; nitro-muriatic acid, thirty drops. Mix. Take a tablespoonful three times a day; and guard against a relapse.

If the fever takes a typhoid form, great care must be used not to give reducing remedies. The purgatives must be more mild, and the tonics used more freely, while the cough is kept loose by slippery elm, or flaxseed, or marshmallow-tea.

MEASLES.—This is an acute inflammation of the skin, both external and internal, combined with an infectious fever.—*Symptoms.*—Chills, succeeded by great heat, languor, and drowsiness, pains in the head, back, and limbs; quick pulse; soreness of throat; thirst, nausea, vomiting, a dry cough, and high-colored urine. These symptoms increase in violence for four days. The eyes are inflamed and weak; and the nose pours forth a watery secretion, with frequent sneezing. There is considerable inflammation of the larynx, windpipe, and bronchial tubes, with soreness of the breast, and hoarseness. About the fourth day the skin is covered with a breaking out which produces heat and itching; and is red in spots, upon the face first, gradually spreading over the whole body. It goes off in the same way, from the face first, and then from the body, and the hoarseness and other symptoms decline with it. At last the outside skin peels off in scales.—*Treatment.*—In a mild form nothing is required but a light diet, slightly acid drinks, and flaxseed or slippery elm tea. Warm herb teas, and frequent sponge baths with tepid water, serve to allay the fever. Care should be taken not to let the patient take cold.

MEASLES, (False) or Rose-Rash.—This appears with the same general symptoms as measles, and continues for about five days; or sometimes comes and goes for several weeks. The rash appears in small irregular patches, paler than those of measles, and of a more roseate color.—*Treatment* should be a light diet, acid drinks and gentle laxatives; or if the disease assumes a darker red, and the patches are more elevated, a tonic is needed.

MENSTRUATION, Age at which it Commences.—Dr. Walter Rigden gives the subjoined statistics obtained from females who were confined at University College Hospital. In 2,696 cases menstruation occurred for the first time:

At the age of—	At the age of—
9 in 3 cases.	14 in 560 cases.
10 " 14 "	15 " 540 "
11 " 60 "	16 " 455 "
12 " 170 "	17 " 272 "
13 " 353 "	18 " 150 "

At the age of—	At the age of—
19 in 76 cases.	23 in 2 cases.
20 " 29 "	24 " 0 "
21 " 7 "	25 " 0 "
22 " 3 "	26 " 2 "

It appears that it is most common at 14 years of age.

MENSTRUATION, Retained.—This may be known by a sense of weight or fullness in the pelvic region, which is increased at each menstrual period; a feeling of weakness and heaviness in the back and loins, aching sensation down the thighs, etc. The treatment requires the aid of a surgeon.

MENSTRUATION, Painful.—This is generally caused by sudden colds at the menstrual period, or soon after delivery, by exhaustion, caused by the luxurious indulgences of civilized life, by unnatural or excessive excitement of the organs. The symptoms are pain in the pelvis, weakness and distress in the small of the back, tenderness and swelling of the breasts, headache, etc. Clots of blood are formed in the uterus, and sometimes a false membrane is thrown off, either entire or in shreds, which is expelled with violent bearing-down efforts, with intervals of comparative ease, like those of child-birth. These pains, and the expulsion of a membrane, might readily be mistaken for a miscarriage. The attacks last from one to four days, during which time many patients are unable to walk or even stand, and especially so during the bearing-down contractions of the uterus, while others are obliged to keep their beds. A cure can only be effected by means of proper treatment during the intervals. The bowels should be kept regular by right diet, and, when constipated, should be freed by enemata of tepid water. Vaginal injections of warm water, and warm or hot sitz-baths, should be employed. Every law of health should be observed, and every possible cause of ill health abstained from. A free, happy, unexcited and unexhausting life will greatly help. During the attack a cold or hot sitz-bath should be taken, and continued while the pain lasts. The relief is more immediate by the hot bath; but the cold bath, at a temperature of from sixty to seventy-five degrees, is the best. At the same time a hot foot-bath, as well as vaginal injections, may be employed. These baths should be repeated on every return of the pain.

MILK SICKNESS.—This is a disease which prevails in the West, in the neighborhood chiefly of level, heavily timbered, rather wet oak land. The plant the eating of which causes the milk to be poisonous is not known. The symptoms of the disease are, a sickness at the stomach, and weakness and trembling of the legs. There is vomiting, and a peculiarly offensive breath. These symptoms continue for weeks, and are often all that are shown in this complaint; but in some severer cases, there are chills and flashes of heat, great oppression about the heart, anxiety, deep breathing, heat in the stomach, violent retching and vomiting, alarming beatings of the heart, and throbbing of the large vessels, and cold extremities. In most cases, the vomiting returns every hour or two, attended by a great burning at the pit of the stomach, the substance thrown up having a peculiar bluish-green color, and a sour smell. As soon as this discharge takes place, the patient falls back upon the pillow, and lies easy until another turn comes round.

The tongue is covered with a whitish coat, and the bowels are obstinately costive. The pulse is small and quick. The treatment does not vary much from that pursued for inflammation of the stomach.

MOUTH, Ulceration of.—This frequently takes place in children whose state of health is below par. It is caused chiefly by a disordered state of the stomach, but occasionally the cause is local, viz., the stump or sharp edge of a decayed tooth. The ulcers sometimes appear as little white specks on the tongue and lining membrane of the mouth, constituting the disease called thrush or aphthæ. This form is frequently seen in infants when nursing, and may be transferred from the infant's mouth to the mother's nipple.

When the ulcers are caused by a disordered state of the stomach, two or three tablespoonfuls of the following mixture should be taken every second or third morning: powdered rhubarb and bicarbonate of soda, of each two drachms; infusion of rhubarb and infusion of gentian, of each four ounces. Mix. When caused by the sharp edge or stump of a tooth, the tooth must be removed or the sharp edge filed away. Children suffering from thrush should be given a nutritious diet with tonics; the tongue and inside of the mouth should be freely painted over with a gargle, composed of borax, two drachms; and glycerine, one ounce, a camel's hair pencil being used.

MUMPS.—This disease, most common among children, begins with soreness and stiffness in the side of the neck. Soon a swelling of the parotid gland takes place, which is painful, and continues to increase for four or five days, sometimes making it difficult to swallow, or open the mouth. The swelling sometimes comes on one side at a time, but commonly upon both. There is often heat and sometimes fever, with a dry skin, quick pulse, furred tongue, constipated bowels, and scanty and high-colored urine. The disease is contagious. The treatment is very simple,—a mild diet, gentle laxatives, occasional hot fomentations, and wearing a piece of flannel round the throat.

NEURALGIA.—This is a pain of the nerves, the disease only affecting the nervous tissue, and giving but one symptom—pain. It may occur in almost any part of the system, and is known under various names—Tic Douloureux, Face-ache, Hemicrania, Sciatica—according to its location. It may be occasioned by miasm, in fever and ague districts; or by whatever debilitates the system, as hysterics, too long suckling an infant, or low diet.—*Treatment.*—For external use, the following liniment is excellent: white soap, twelve ounces; camphor, six ounces; oil of rosemary, one and a half ounces; alcohol, four pints; opium, three ounces. Mix and filter. Where the disease is caused by miasm, the treatment must be with quinine, iron and other tonics, to get up the blood. Plenty of exercise in the open air is important, if well protected from the weather.

NERVOUSNESS.—The cure of nervousness is best effected by restoring the healthy action of the stomach and bowels, and by the use of proper exercise, especially in the open air. The stomach should not be overloaded with indigestible food, and the bowels should be occasionally relieved by the use of some mild aperient. Aber-

nethy's injunction to a nervous and dyspeptic lady, "Dismiss your servants, madam, and make your own beds", should be recollected by all as a proof of the importance that eminent surgeon attached to exercise.

NEURALGIA, Other Remedies for.—1. The application of bruised horse-radish. — 2. One drachm doses of hypophosphite of soda, taken three times a day in beef tea, is a good remedy for this painful affection. — 3. The oil of pepper-mint lightly applied to the seat of pain with a camel-hair pencil will afford relief.

NIGHT-MARE, To prevent.—Eat nothing after 3 o'clock p. m. and no night-mare will ever assert its suffocating presence.

NIPPLES, Sore.—Nursing mothers are some times seriously troubled with this painful affliction, and would be willing to make almost any sacrifice to have a cure for it. The following simple mixture, will give immediate relief: Powdered borax, a small, even teaspoonful; pure water two-thirds of a teacupful, alcohol, one and a half tablespoonful. Mix and use, washing the nipples with it. Or take ripe raw tomatoes, pare and cut them up; then stir in flour enough to make a stiff dough. Roll and work it with the hands until it becomes very smooth. Spread a thin plaster and apply it to the affected part with a cloth over it, changing the dry plasters for fresh ones as often as necessary. This keeps up a constant perspiration, which is what is needed. If you cannot get tomatoes, a dough made with cold water and flour will answer.

NOSE-BLEED.—This may be caused by violence, or may arise from an impoverished state of the blood. When it occurs in persons of middle age it is more serious, as it is then often a symptom of some other disease. The bleeding can generally be stopped by making the patient raise both his arms above his head, and hold them there for some time. Sponging with cold or iced water to the forehead and face, or applying a towel wet with cold water between the shoulders, will, in most cases, succeed. The application of a strong solution of alum or iron-alum to the inside of the nostrils or plugging the nostrils with lint or cotton wool soaked in the solution, may be necessary if the bleeding is profuse. See also page 12.

NURSING SICK CHILDREN.—This is a more delicate task than nursing adults. The greatest watchfulness and judgment are necessary to determine the meaning of their symptoms, and in giving medicines. Just as great care should be observed not to disturb them, as if they were able to make complaints of any carelessness. Let the room, where a child is sick, be shady, quiet, and cool. Be careful not to speak so suddenly as to startle the half-sleeping patient; and handle it with the greatest tenderness, when it is necessary to move it.

If it is the lungs that suffer, have the little patient somewhat elevated upon pillows for easier breathing, and doing every thing to soothe and make it comfortable, so as not to have it cry, and thus distress its inflamed lungs.

In all fevers and bowel complaints, especial attention must be given to frequent sponging of the skin with tepid water; and great care exercised not to burden the stomach with too much food or drink. If the skin becomes irritated for any reason, sprinkle it with flour or pulverized starch. If the child is very weak, be careful not

to move it too suddenly, as it may be startled into convulsions. In administering a bath, the greatest pains must be taken not to frighten the child. It should be put in so gradually, and so insensibly amused by something placed in the water on purpose, as to forget its fear.

PAPULOUS SCALL.—Papulous scall is a mattery pimple developed in a highly inflamed skin. The blisters are about the size of a split pea, and are surrounded by a red ring. They are generally separate, not clustered like crusted tetter. They are scattered over various parts of the body, and are followed by a hard black crust, or by a sore. The disease is either acute or chronic. The chronic form is found in weakly children, or persons reduced by sickness or low living.—*Treatment.*—For the acute form, low diet, gentle laxatives, cold sponge-bath on the sound parts, and an ointment of oxide of zinc, one dram; spermaceti ointment, one ounce, mixed. For the chronic form, tonics should be given internally, and the above ointment used.

PILES.—This is another very common complaint, and one which causes great distress. It consists in a fullness of blood, and languid circulation in the lower part of the bowel or rectum. In consequence of this congestion, either the veins of the gut become enlarged or varicose, or the blood gets infiltrated into the cells beneath the mucous membrane, and collects so as to form bloody tumors. These tumors, which are seldom absent, are the leading feature of the piles. Sometimes they appear externally, around the anus; this is external piles. At other times they are within the bowel; the complaint is then called internal piles. When the blood is discharged, they are called bleeding piles; and when not, blind piles.

Symptoms.—Usually there is a sense of weight and weakness in the lower part of the back and loins, with a painful itching about the anus. On going to stool, there is a burning, cutting pain experienced, which is followed by bearing down and tenesmus. If it be bleeding piles, the little tumors will bleed at every motion of the bowels. There is often disagreeable sensations in the head, and an irritable state of mind, and a sense of fullness and anxiety in the stomach. The disease is caused by habitual costiveness, sitting a great deal, riding much on horseback, high-seasoned food, over exertion, and induration of the liver. It is also very common in pregnancy from several causes.

Treatment.—Medicines—purges in particular—must not be taken. The costiveness may be corrected as before mentioned; or if it is necessary to give something to move the bowels, let it be this: confection of senna, two ounces; cream tartar, one ounce; flower of sulphur, one ounce; syrup of ginger, enough to make a stiff paste. Mix. A piece as large as a nutmeg is to be taken as often as necessary to keep the bowels open. A soothing ointment, made of two ounces of lard, and one dram of sulphur, and rubbed between two plates of lead until it is well blackened, is excellent for an application to the parts. Frequent injections of cool water will do as much as any thing to allay the inflammation. Steaming the parts over a hot decoction of hops, or stramonium, will frequently give relief. The diet must be cooling and loosening.

PIMPLES, DRY.—Dry Pimples, under the several names of Red Gum, Tooth Rash, as seen

in children, and Lichen and Prurigo in adults, are exceedingly troublesome, and if much scratched and torn, may form painful sores. Prurigo often causes elderly people a great deal of suffering, giving them no rest day or night, from the tormenting sensation of numberless ants crawling upon the skin, or red-hot needles piercing it.

Treatment.—Careful diet, and gentle cathartics, or tonics, according to the condition of the system. Externally, cold, salt-water sponge-bath, and glycerine, applied with a soft sponge, vinegar and water, or creosote ointment. If the itching affects some very sensitive parts, a wash of rose-water, four ounces; pulverized borax, half an ounce; sulphate of morphine, six grains, should be used many times a day.

PLEURISY.—This is an inflammation of that membrane which lines the chest, and covers the outer surface of the lungs. It generally commences by shiverings, which are soon followed by a high fever, with a peculiarly hard, resisting pulse; sharp, stabbing pain in the side—generally just below the nipple, but sometimes extending to the shoulder, arm pit and back; hurried and interrupted breathing; and a short, dry cough. The pain is aggravated by motion, coughing, or taking a long breath. The patient can not lie on the affected side, he is anxious, and afraid to move for fear of the pain, which often causes him to cry out. At a more advanced stage, the patient lies on the ailing side, in order to leave the other lung more at liberty.—**Treatment.**—Bleeding is commonly resorted to in this disease; but it should not be resorted to, if thorough sweating can be made to answer the purpose. The compound tincture of Virginia snake-root will generally induce free perspiration, if given every half-hour in teaspoonful doses. It may be given in an infusion of balm, or catnip. At the same time the affected side should be fomented with hops, tansy, wormwood, etc., applied quite hot.

PROUD FLESH, To Remove.—Pulverize loaf-sugar very fine, and apply it to the part affected. This is a new and easy remedy, and is said to remove it entirely without pain.

POX, CHICKEN.—An eruptive skin disease, consisting of smooth vesicles of various sizes, which afterwards become white and straw colored, and about the fourth day break and scale off. In hot weather the discharge sometimes becomes purulent, and at others the eruption is attended with considerable fever. The treatment consists in the adoption of a light vegetable diet, and in the administration of mild aperients and cooling drinks.

POX, COW.—This disease was proposed as a substitute and preventive of smallpox, by Dr. Jenner in 1798. The success which has followed its artificial production has nearly led to the extinction of smallpox in England. The process of vaccination is similar to that of inoculation for the smallpox, before noticed. About the third day the puncture usually becomes red and elevated, and continues to enlarge and become vesicular, until at about the 8th or 9th day, it is at its height, and the vesicle is surrounded with a florid areola. About the eleventh or twelfth day these symptoms decline; the centre of the pustule becomes brown, and a dark scale gradually forms and separates, leaving the arm as heretofore. This disease seldom requires medical treatment;

but should febrile symptoms come on, an aperient may be given.

POX, SMALL.—This disease comes on with the usual symptoms of inflammatory fever. About the third day, red spots, resembling flea bites, make their appearance on the face and head, and gradually extend over the whole body. About the fifth day small circular vesicles, depressed in the centre, surrounded by an areola, and containing a colorless fluid, begin to form, when the feverish symptoms abate; about the sixth day the throat becomes sore; about the eighth day the face is swollen, and about the eleventh day the pustules acquire the size of a pea, and cease to enlarge, the matter which they contain becomes opaque and yellow, a dark central spot forms on each, the swelling of the face subsides, and secondary symptoms of fever come on; the pustules become rough, break and scab over, and a dark spot remains for some days, often followed by permanent indentation. At the end of the sixteenth or eighteenth day, the symptoms usually disappear. In the confluent smallpox, the pustules coalesce, the eruption is irregular in its progress, and the inflammatory symptoms are more severe. The treatment of ordinary cases of smallpox resembles that mentioned above for chicken-pox. The apartment should be large, cool, and well-ventilated. The windows should be open day and night, and the linen changed daily. During the discharge of the pustules, change it twice a day. The patient should be taken into the open air often. Children and others, even if they have been vaccinated, should not visit the sick-room, though they need not leave the house. After the disease is over, the bed and bedding should be scoured, the room fumigated, and thoroughly cleansed. It is stated that if a patient, in the beginning of the attack, be put in a room from which absolutely all light is excluded save that of a candle, the effect is to arrest the disease in the papular or vesicular stage; it never becomes purulent, and the skin between the vesicles is never inflamed or swollen; the liquor sanguinis is prevented from becoming pus; the large scabs of matter never form over the face; there is no intense pain, and only trifling itching, and the smell is either very slight or altogether wanting.

POX, (SMALL) Remedies for.—1. The treatment of small-pox in the State Almshouse in Massachusetts, where the disease prevailed for three months, has been singularly successful. Out of about sixty cases, but one fatal result occurred, and that was in the case of a man who was taken to the house in the last stage of the disease. The remedy used with so much success was a tea made from a plant known in the *Materia Medica* as *Serracenia Purpurea*, familiarly called Ladies' Saddle or Water Cup, the medicinal virtue of which lies in the root. The effect of the remedy, which has been newly discovered and found remarkably efficient whenever tried, is to allay the fever and irritation caused by the formation of pustules, which are rapidly dried up, leaving but slight, if any, traces.

2. A remedy practiced in China is when the preceding fever is at its height, and just before the eruption appears, the chest is rubbed with croton oil and tartar emetic ointment. This causes the whole of the eruption to appear in that part of the body, to the relief of the rest. It also secures a full and complete eruption, and

thus prevents the disease from attacking the internal organs.

POX (Small), Pitting in.—1. In a case recently treated, in which the eruption so completely covered the face that it was almost impossible to place the point of the finger on it, without touching it in one or more places, Dr. J. C. Whitehall, succeeded in absorbing the "pocks" completely, by anointing the face freely with a solution of carbolic acid, 1 scruple, and bi-sulphate of soda, 2 drachms, in an ounce of pure fresh glycerine, and causing each vesicle, as soon as formed, to be punctured with a finely pointed hard wood skewer and some of the solution introduced. At the same time light was excluded, as far as possible, from the room, and a liniment of croton oil used over the chest as a revulsive. Not a "pit" was formed on the face.—2. I. H. Bird, M. D., uses an ointment made of charcoal and lard to prevent pitting in smallpox. This is applied freely over the surface of the face, neck and hands, as soon as the disease is distinguished, and continued until all symptoms of suppurative fever have ceased. The application allays the itching, and seems to shorten the duration of the disease, and leaves the patient without a blemish, the eruption protected by the ointment not even showing signs of pustulation; the charcoal preventing the action of light, and lard that of air.—3. The *Melia Azidavacita* L. of India is used in that country by the natives to cover the bodies of patients recovering from small-pox, it being believed to prevent the marks becoming permanent. Dr. Wight says of it: The leaves beaten into a pulp and externally applied act like a charm in removing the most intractable form of psora and other pustules of an eruptive nature.—4. Sweet oil and lime-water, as these are generally prepared for applications to burns or water-scalds, will operate to prevent or allay all irritation, and hinder the discoloration of the cuticle and the pitting, which are so often the accompaniment of this fearful disorder.

QUINSY.—This is an inflammation of the tonsils, or common inflammatory sore throat; commences with a slight feverish attack, with considerable pain and swelling of the tonsils, causing some difficulty in swallowing; as the attack advances these symptoms become more intense, there is headache, thirst, a painful sense of tension, and acute darting pains in the ears. The attack is generally brought on by exposure to cold, and lasts from five to seven days, when it subsides naturally, or an abscess may form in tonsil and burst, or the tonsil may remain enlarged, the inflammation subsiding.

Treatment.—The patient should remain in a warm room, the diet chiefly milk and good broths, some cooling laxative and diaphoretic medicine may be given; but the greatest relief will be found in the frequent inhalation of the steam of hot water through an inhaler, or in the old-fashioned way through the spout of a teapot.

RHEUMATISM.—Rheumatism is a painful affection, brought on, when acute, most frequently by exposure to cold, and wet feet. Rheumatism is caused by acrid or poisonous matter in the blood, and has for its seat the fibrous tissue, or that thready texture which enters into the composition of the cords and muscles of the human body. The lining membrane of the joints is peculiarly liable to rheumatic affection.

RHEUMATISM, Acute.—This has for its

symptoms, high fever, full pulse, furred tongue, profuse, sour sweat, scanty, high-colored urine, swelling of the joints, with slight redness, great tenderness, and severe pain. It often changes from one set of joints to another, or to various parts of the body. This sudden shifting is very dangerous, for the inflammation is apt to seize upon the lining membrane of the heart, which may prove fatal.—**Treatment.**—Keep the bowels open. Give tincture of black cohosh and tincture of veratrum viride—one drachm of the first, and two ounces of the last; mix, and give a teaspoonful, three times a day, or often enough to produce sweating. If the disease is reduced by this, and the exhaustion not too great, continue it until the disease abates. Tincture of black cohosh-root, and tincture of colchicum-root, in proportion of two parts of the first to one of the last, is an excellent remedy. Forty drops is a dose. Fomentations of hops, on the inflamed joints, will generally bring relief. The system wants building up with tonics and nourishing diet, when subject to this disease.

RHEUMATISM, Chronic.—This is not attended by fever, but generally lasts a long time, and is the cause of much suffering. Its symptoms are, stiffness and lameness of the joints, sometimes a little swelling, and inability to move these joints without great trouble at first; but as the patient grows warm with exercise, the difficulty disappears.

Treatment.—The electro-magnetic treatment is excellent, generally perfectly successful. Liniment of sweet oil, one ounce; water of ammonia, one ounce; mixed and rubbed on with flannel, is very good; or, soap liniment, two ounces; chloroform, one dram; mixed. Tincture of black cohosh is very useful as an internal remedy. Dose, forty drops. A piece of oiled silk, worn over the joint, keeps up a perspiration, and aids in the cure. Sweet oil, rubbed on before the fire on going to bed, is also good. The bowels should be kept regular.

RHEUMATISM, Other Remedies for.—1. Bathe the parts affected with water in which potatoes have been boiled, as hot as can be borne, just before going to bed; by the next morning it will be much relieved, if not removed. One application of this simple remedy has cured the most obstinate of rheumatic pains.—2. Half an ounce of pulverized saltpetre put in half a pint of sweet oil; bathe the parts affected, and a sound cure will be speedily effected.—3. Rheumatism has frequently been cured by a persistent use of lemon-juice, either undiluted or in the form of lemonade. Suck half a lemon every morning before breakfast, and occasionally during the day, and partake of lemonade when thirsty in preference to any other drink. If severely afflicted, a physician should be consulted; but, in all cases, lemon-juice will hasten the cure.—4. By the valerian bath, made simply by taking one pound of valerian root, boiling it gently for about a quarter of an hour in one gallon of water, straining and adding the strained liquid to about twenty gallons of water in an ordinary bath. The temperature should be about 98°, and the time of immersion from twenty minutes to half an hour. Pains must be taken to dry the patient perfectly upon getting out of the bath. If the inflammation remain refractory in any of the joints, linseed meal poultices should be made with a strong decoction of valerian root, and applied.

RING (TIGHT), To Remove.—It is seldom necessary to file off a ring, too tight to readily pass the joint of the finger. If the finger is swollen, apply cold water to reduce the inflammation, then wrap a small rag wet in hot water around the ring to expand the metal, and soap the finger. A needle threaded with strong silk can then be passed between the ring and finger, and a person holding the two ends and pulling the silk while slowly sliding it around the periphery of the ring may readily remove the ring. If the ring is a plain hoop this process is easy; if it has a setting or protuberance more care will be required. Another method is to pass a piece of sewing silk under the ring and wind the thread, in pretty close spirals and snugly, around the finger to the end. Then take the lower end—that below ring—and begin unwinding. The ring is certain to be removed unless the silk is weak. The winding compresses the finger and renders the operation less difficult.

RINGWORM.—1. Take yellow-dock root; cut in small pieces, and simmer them in vinegar, and when the strength is extracted, strain off the vinegar, which apply to the part affected at least three times a day. At the same time, it is well to drink a tea made of the same root; or take some of the extract of yellow-dock root, which can be found at any drug store.—2. The head to be washed twice a day with soft soap and warm soft water; when dried, the places to be rubbed with a piece of linen rag dipped in ammonia from gas tar.—3. Take the back of a silver watch or any smooth piece of silver, rub on and around the sore a few minutes four to six times; it will soon cure it.

ROOM, How to Cool.—The simplest and cheapest way to cool a room is to wet a cloth of any size, the larger the better, and suspend it in the place you want cooled. Let the room be well ventilated, and the temperature will sink from ten to twelve degrees in less than an hour. This is the plan adopted by many Eastern nations.

RUPTURE.—The first thing to be done is to put the bowel back in its place, by gently pressing and kneading the tumor, and swaying it back and forth—being careful to use no violence—until it can be pushed within the abdominal walls. It is then to be kept in its place by the use of a truss, worn all the time.

SCRATCHES.—Trifling as scratches often seem, they ought never to be neglected, but should be covered and protected, and kept clean and dry, until they have completely healed. If there is the least appearance of inflammation, no time should be lost in applying a large bread and water poultice, or hot flannels repeatedly applied, or even leeches in good numbers may be put on at some distance from each other.

SCROFULA.—It is useless to describe this disease, or to mention its causes. It is an evil as patent as it is dreadful. Being hereditary, it may never be eradicated wholly from the constitution, but may no doubt be alleviated.—*Treatment.*—Iodine is the one great remedy for this disease. Dissolve one scruple of iodine and two scruples of iodide of potassium in seven teaspoonfuls of water. Of this, give ten drops three times a day in a little water, gradually increasing the dose to one and a half or two times that amount. Where there is much debility, the iodide of iron, in doses of twenty-five or thirty drops, in water, three times a day, should be

given. Medicinal springs, containing iodine, are excellent. The condition of the bowels should be always looked to, keeping them open. Bathing frequently, exercise out of doors, healthy air, cheerfulness, and a nourishing diet, are all necessary. Either flannel or silk should be worn next the skin summer and winter.

The tumors should be bathed, before they become much sore, with a solution of muriate of lime, several times a day. If they are inflamed, apply poultices of slippery elm, and powdered bayberry, equal parts. Flaxseed-poultices are good. When the tumors are opened, the ulcers must be washed out with soap-suds, and dressed with a salve made of beeswax and sweet oil; change two or three times a day. Red iodide of mercury-ointment is needed when the ulcers are indolent. Saleratus-water baths are good.

SCURVY.—This is a disease which seamen on a long voyage, and men on long journeys over uninhabited countries, are subject to; and is occasioned probably by too much salt food, and other unnatural habits. Its symptoms are, languor, loss of strength, and great depression of mind. The patient has no energy to move; the whole skin looks pale and bloated, and the breath has a fetid smell. The gums are soft, red, swelled, and spongy, and bleed upon the slightest touch; sometimes the blood oozes from them spontaneously. The teeth get loose, and often fall out. The skin is spotted with purple, as if it were bruised, and the spots running together, form large discolored patches. Ulcerous sores break out on various parts of the body, and discharge a thin matter. The ulcers are covered with a crust. Twinging pains assail even the bones; the pulse is weak; all the secretions have an offensive smell; and, in truth, the whole body is approaching putridity; the flesh dwindles away, and the bones break easily. In bad cases, blood is discharged from the bladder, bowels, womb, nose, mouth; and the smallest exertion is followed by fainting, and in some cases by sudden death.—*Treatment.*—Quinine is one of the most important medicines in this disease; it may be given in from one to two-grain doses, twice or three times a day. Gentian and quassia are also suitable remedies; so is muriatic tincture of iron. But better than all are fresh and juicy vegetables and fruits. Spinage, sorrel, lettuce, dandelion, cresses, and the like, are the very best things, when they can be had. Lemon-juice is excellent. Potatoes, when scraped and eaten raw, are especially good; also valuable cooked. Spruce-beer is good, and may be made at sea from the essence, as may also many kinds of beer. To correct costiveness, cream of tartar in water, drank freely, will be needed. For looseness, give a tea made of logwood or geranium. Apply a solution of alum to the gums, or tincture of myrrh. Vinegar is good in this disease, and should always be carried to sea, together with dried fruits, and various dried herbs. The patient suffering with this disease should be moved with care, as life may be easily extinguished.

SEA SICKNESS.—Those liable to be sick should make a hearty meal not more than two or three hours before going on board. They should select a spot as near as possible to the centre of the vessel, and lie down before she gets under weigh. The horizontal position should be rigidly kept during the whole passage. The person

should be well covered, not only to protect from cold, but to shield from disagreeable sounds, sights, and smells. A stateroom should be selected as near as possible to the center of the ship, but not near the furnaces. In going to Europe, it is better to be on the starboard, and, in returning on the port side which will be the sunny one. The following suggestions for the prevention of sea sickness have proven efficacious:

1. Have every preparation made at least twenty-four hours before starting, so that the system may not be exhausted by overwork and want of sleep. This direction is particularly important for ladies, though useful to all.

2. Eat as hearty a meal as possible before going on board.

3. Go on board sufficiently early to arrange such things as may be wanted for the first day or two, so that they may be easy of access; then undress and go to bed before the vessel gets under weigh. The neglect of this rule by those who are liable to sea-sickness is sure to be regretted.

4. Eat regularly and heartily, but without raising the head, for at least one or two days. In this way the habit of digestion is kept up, the strength is preserved, while the system becomes accustomed to the constant change of equilibrium.

5. On the first night out, take some mild laxative pills, as for example, two or three of the compound rhubarb pills. Most persons have a tendency to become constipated at sea, although diarrhoea occurs in a certain percentage. Constipation not only results from sea-sickness, but in turn aggravates it. The effervescing laxatives, like the seidlitz, or the solution of the citrate of magnesia, taken in the morning on an empty stomach, are bad in sea-sickness.

6. After having become so far habituated to the sea as to be able to take your meals at the table and to go on deck, never think of rising until you have eaten something, as a plate of oatmeal porridge, or a cup of coffee or tea, with sea biscuit or toast.

7. If subsequently during the voyage the sea should become unusually rough, go to bed before getting sick. It is foolish to dare anything when there is no glory to be won, and something may be lost.

SICK, Food for.—The greatest care should be taken in the preparation of food for the sick. It should be just right, or the weakened and sensitive appetite will refuse it. If gruel is scorched in preparing, or whatever you attempt fails the first time to be as nice as it should be, throw it away and make more. Be scrupulously neat in serving it up. Use your prettiest dishes and finest napkins. Something depends upon looks; and the eye of a sick person may be unusually critical. Except in the preparation of light puddings, the process of baking is inadmissible for the sick. Roasting is better—a light roast potato is sometimes very acceptable. Meats should be delicately broiled, except when boiled for broths.

SICK-ROOM, Pure Air in.—The disagreeable and unhealthy evil of the foul gas escaping from a kerosene lamp burnt all night in a sick-room is very easily remedied. All that is necessary is to take a raisin or any suitable-sized box, that will contain the lamp when set up on end. Place the lamp in the box, outside the window, with the

open side facing the room. When there are blinds, the box can be attached to each by leaving them a little open and fastening with a cord; or the lamp box can be nailed to the window casing in a permanent manner. The lamp burns quite as well outside, and a decided improvement of the air in the room is experienced.

SICK-ROOM, Caution in visiting.—Never venture into a sick-room in a violent perspiration (if circumstances require a continuance there for any time), for the moment the body becomes cold, it is in a state likely to absorb the infection, and receive the disease. Nor visit a sick person (especially if the complaint be of a contagious nature), with an empty stomach; as this disposes the system more readily to receive the infection. In attending a sick person, stand where the air passes from the door or window to the bed of the diseased, not betwixt the diseased person and any fire that is in the room, as the heat of the fire will draw the infectious vapor in that direction, and much danger would arise from breathing in it. Do not enter the room the first thing in the morning before it has been aired; and when you come away, take some food, change your clothing immediately, and expose the latter to the air for some days.

SKIN, Discolored.—As moles, freckles, sunburn, etc., is the result of diseased action. It is not best to meddle with moles. For the change of color called sunburn, a lotion made of two ounces of lime-water, and two ounces of flaxseed oil, is the best. Freckles are removed with the same, or with this: corrosive sublimate, five grains; almond mixture, half a pint. Mix and apply. If the skin is bleached in spots, apply some stimulating liniment.

SKIN-GRAFTING.—In a letter to the London Lancet, David Fiddes, Surgeon to the Royal Infirmary, states that it is unnecessary to put the patient to the pain of cutting a piece of healthy skin from the body for the purpose of transplantation. All that is necessary to be done, is to take a long bistoury or razor and shave or scrape off the epidermis scales from the convex aspects of the forearms and thighs, and place them on the healthy granulations. This can best be done by brushing the scales off the bistoury with a camel hair pencil. After securing them in situ for three or four days by means of adhesive plaster, the granulations on which the epidermis scales were placed assume a glazed, bluish appearance, which gradually grows into skin, and meets the nearest edge of the healing ulcer, which edge shoots out, and meets the newly formed skin on the granulation.

SLEEPLESSNESS, Cure for.—Go without supper. If accustomed to drink tea, take none in the latter part of the day, and gradually leave it off altogether. Spend some hours of the afternoon in the open air; avoid everything calculated to excite the mind in the latter part of the day, sedulously putting away all thought and talk about business; seek cheerful, but not boisterous sociability—that which is sedative rather than that which is exciting; have the sleeping room well ventilated; avoid sleeping on feathers; at night lay off all garments worn during the day and put on fresh ones; sleep alone; and getting into bed take a comfortable position and determinedly keep it till sleep comes, compelling yourself to avoid tossing and tumbling, and fidgeting about. Learn to control your mental activities;

when you get to bed stop thinking; if your thoughts begin to wander in any direction, bring them back and hold them steadily to a fixed point. Keep this up till you become master of your thoughts. Then in all directions seek to bring the entire system under the control of the laws of life and health, and be patient. Sleeplessness is a thing not to be overcome in a day, any more than rheumatism or bronchitis.

If you find yourself inclined to wake up at a regular hour in the night and remain awake, you can break up the habit in three days, by getting up as soon as you wake, and not going to sleep again until your usual hour for retiring; or retire two hours later, and rise two hours earlier, for three days in succession not sleeping a moment in the daytime.

Nervous persons, who are troubled with wakefulness and excitability, usually have a strong tendency of blood to the brain, with cold extremities. The pressure of the blood on the brain keeps it in a stimulant or wakeful state, and the pulsations in the head are often painful. Let such rise, and chafe the body and extremities with a brush or towel, or rub smartly with the hands to promote circulation and withdraw the excessive amount of blood from the brain, and they will fall asleep in a few moments. A cold bath, or a sponge bath and rubbing, or a good run, or a rapid walk in the open air, or going up and down stairs a few times just before retiring, will aid in equalizing circulation and promoting sleep.

SLEEP for INFANTS.—Infants can not sleep too long; it is well when they can enjoy a calm and long-continued rest, of which they should by no means be deprived, as this is the greatest support granted them by nature. A child lives comparatively much faster than an adult; its blood flows more rapidly, and sleep promotes more uniform circulation, and facilitates digestion, while a horizontal position is favorable to growth and development. Still, sleep should be proportioned to the age. After six months, the time of sleep, can be regulated. An infant should always sleep the whole night in preference to the day, and as it grows older, a few hours morning and afternoon; and, after a while, to sleep after dinner will be sufficient. After a child is four or five years old, its time of sleep may be shortened one hour every succeeding year, so that a child of seven will not require to sleep more than eight or nine hours.

SLEEP, Position in.—Sleeping-rooms should always be so arranged, if possible, to allow the head of the sleeper to be towards the north. Frequently, in cases of sickness, a person will find it impossible to obtain rest if the head is in any other direction, and often a cure is retarded for a long time. A Vienna physician had a patient who was suffering from acute rheumatism, with painful cramps running from the shoulders to the fingers; and, while his head was to the south, he could do nothing towards his relief. On turning the bed, however, so the head was towards the north, the patient uttered expressions of pleasure, and in a few hours a great improvement had taken place, and he was in a few days almost entirely cured. Many other cases are given by scientific persons; and people, in building houses, should always have this in view.

SLEEPING TOGETHER.—During the night there is considerable exhalation from our

bodies, and at the same time we absorb a large quantity of the vapors of the surrounding air. Two healthy young children sleeping together will naturally give and receive healthy exhalations; but an old, weak person near a child will, in exchange for health, only return weakness. A sick mother near her daughter communicates sickly emanations to her; if the mother has a cough of long duration, the daughter will at some time also cough and suffer by it; if the mother has pulmonary consumption, it will be ultimately communicated to her child. It is known that the bed of a consumptive is a powerful and sure cause of contagion, as well for men as for women, and the more so for young persons. Parents and friends ought to oppose as much as is in their power the sleeping together of old and young persons, of the sick and of the healthy. Another reason ought to forbid every mother or nurse keeping small children with them in bed; notwithstanding the advice of prudence, no year passes that we do not hear of a new involuntary infanticide. A baby full of life, health and vigor in the evening is found dead the next morning, suffocated by its parents or nurse.

SPLINTERS, To Extract.—Thorns and splinters finding their way under the skin frequently give no inconsiderable pain, and unless extracted, the annoyance may be very great, as inflammation will in all probability ensue, which is the process nature adopts for getting rid of the cause of irritation. If the splinter or thorn cannot be immediately extracted,—for which purpose a needle will be found in most cases a sufficient surgical instrument,—linen dipped in hot-water ought to be bound round the place, or the part may be bathed in hot water. In the event of inflammation, which may probably issue on the production of an ulcer, the steam of hot water should be applied, and afterwards a poultice of bread and milk.

SPLEEN, Chronic Inflammation of.—The symptoms are a feeling of tightness and pain in the left side—the pain being increased on pressure, or by lying upon the left side. Sometimes the organ enlarges, so as to be felt by the hand. There is sometimes numbness, weakness of the legs, palpitation of the heart, difficulty of breathing, inability to exercise much, obstinate constipation, vomiting of food, piles, dry skin, tongue coated white or red, low spirits, and occasionally dropsical affections. Treatment should be about the same as in inflammation of the liver. After the active inflammation is subdued, the warm bath may be used once or twice a week. In the chronic form of the disease, counter irritation with the compound tar-plaster, with mustard-poultices, Croton oil, or tincture of iodine, will be particularly needed. Keep the bowels open, and if the patient is pale and bloodless, give iron as a tonic.

SPRAIN.—As soon as possible after the accident get a calico bandage one to two yards long, and two to two and a half inches wide; wet it in cold water, and roll it smoothly and firmly round the injured part. Keep the limb at rest, exposed to the air, and continually damp with cold water. The sooner after the accident the bandage is applied, the less pain and swelling there will be; but if pain becomes excessive, care must be taken to slightly loosen the bandage.

SPASMS, Remedy for.—Take of acetate of morphia, 1 grain; spirit of sal volatile, 1 ℥. oz.

sulphuric ether, 1 fl. oz.; Camphor julep, 4 fl. oz. Mix. It should be kept closely corked, in a cool place, and should be well shaken before use.—Dose.—A teaspoonful in a glassful of cold water or wine, as required.

SQUINTING.—Squinting frequently arises from the unequal strength of the eyes, the weaker eye being turned away from the object, to avoid the fatigue of exertion. Cases of squinting of long standing have often been cured by covering the stronger eye, and thereby compelling the weaker one to exertion.

It is well known that in infancy there is not unfrequently a tendency to squint; this often passes away as the child increases in age; but it sometimes becomes quite a fixed habit, demanding the knife of the oculist for its permanent cure. A means of rendering this operation unnecessary by curing the tendency in early life has been suggested, which is worthy of trial. A pair of spectacles is procured without any glasses in them. One of the orifices opposite the eye that squints is to be filled with thin horn or with ground glass, and in the centre of the horn or glass is to be made a small hole. It is obvious that to see with the squinting eye it is necessary for the child to look directly through the orifice in the centre. He will thus acquire the habit of looking forward towards an object, instead of looking to the right or left hand of it. It is not at all improbable that the slight squint, which in infancy is apparently only a habit, may be remedied by this means.

STOMACH, Acid.—Prepared chalk, to be found always at druggists, is an excellent remedy for this complaint, and all the unpleasant headaches and sickness to which it gives rise. This is one form of dyspepsia, and is sometimes relieved by the use of this simple remedy.

STOMACH, Acute Inflammation of.—This is a rare disease, and generally comes from irritating and corrosive substances being taken into the stomach. Blows, sudden stoppage of sweat, and excessive use of ardent spirits, may also excite it. The symptoms are, a burning pain in the stomach, thirst, restlessness, anxiety, constant vomiting, prostration of strength, quick, hard and small pulse, incessant retching, a sunken countenance, hiccup, cold hands and feet, and a damp skin.—**Treatment.**—If the inflammation be excited by poison, the remedies named under antidotes for poisons, must be first employed. The poison being neutralized or thrown off, the inflammatory condition must be combated with the remedies usual for such states. Mustard-poultices to the feet, along the spine, and over the pit of the stomach, will be among the first things resorted to, and should be followed by hot fomentations with stramonium-leaves or hops, repeating these applications as long as required. For drinks, give rice-water, toast-water, arrow-root gruel, slippery-elm infusion, and cold water. These should be taken in very small quantities—a teaspoonful at a time—about twenty drops of tincture of aconite-root being added to half a tumblerful. Lumps of ice held to the mouth, or occasionally swallowed, may be useful. Neither physic nor emetics are proper now, but injections of simple soapuds will be required. The remedies must be followed up until the tenderness of the stomach is all gone. Be very careful not to overload the stomach before perfect recovery has taken place. Only the simplest and most

cooling diet can be used during the period of recovery.

STOMACH, Chronic Inflammation of.—This is known by a pain in the stomach, increased by the presence of food, by belching up gas, by vomiting, fickle appetite, seasons of thirst, tongue white in the center and red at the tip, or sometimes red and smooth, is a disease which sometimes ends by ulceration of the stomach, and death.

Treatment.—Counter-irritants over the stomach, as in acute inflammation, frequent warm or cold baths, according to the patient's constitution; a cold compress worn on the stomach at night; and the most careful diet, consisting mostly of gum-water, rice-water, arrow-root gruel, toast without butter, etc. In two or three weeks the disease will yield, under this persistent starving and cooling system.

STRICTURES.—A difficulty in passing water, which, instead of flowing in a full stream, either dribbles away, twists like a corkscrew, or splits and forks in two or three directions. They are occasioned by strong injections, long-continued or ill-treated clap. The cause, however, is not always to be satisfactorily ascertained.—

Treatment.—Procure several bougies of different sizes. Take the largest one, dip it in sweet oil, and pass it into the urethra till it meets with the stricture, then make a mark on the bougie, so that when it is withdrawn you can tell how far down the passage the obstruction exists, and having ascertained this, take the smallest one, well oiled, and endeavor to pass it an inch or two beyond the stricture. If this can be accomplished, let it remain so a few minutes. This must be repeated every day, letting the instrument remain somewhat longer each time it is passed, and after a few days using one a little larger, and so on progressively until the largest one can be introduced. If this fails, apply to a surgeon, who may destroy it with caustic or the knife.

ST. VITUS' DANCE.—This disease affects mostly the muscles and the limbs, and consists of an involuntary motion of both. A jerking of the limbs prevents their obeying the will, and the patient in vain essays to do what he wishes at the first attempt. The disease is believed to be a partial palsy of the muscles. It is caused by whatever excites and weakens the nervous system.—**Treatment.**—Remove, in the first place, all causes of excitement, and substitute active out-door exercise. Be careful not to excite fear, anger, or any strong emotion. If the food has been too stimulating, replace it by cooling, simple diet; or if too low, give more nourishing articles. Regulate the bowels, and build up the nervous system by giving tonics, and nerve medicines. This is a good medicine: extract of scullcap, two drams; extract of chamomile, two drams; extract of boneset, one dram; quinine, one dram; cayenne, one scruple; oil of valerian, half a dram. Beat well together, and make ninety pills. For an adult, one pill every two or three hours. A tepid shower-bath is excellent, unless it frightens the patient, when it should be changed for the sponge-bath.

SUNSTROKE, to Avoid.—There is something to be remembered by those most liable to sunstroke. Sobriety is a great preventative. The man who abstains from all spirituous drinks during excessively hot weather is vastly less liable

to sunstroke than he who drinks habitually. Regular hours for sleep and meals, and the avoidance of all irregularities and excesses, are among the other preventatives. Bathing, washing, or sponging the skin all over in the morning is a wholesome precaution. Every one employed out doors, that can possibly do it, should wear a light, easy-fitting, broad-brimmed hat. Bricklayers, carpenters, laborers, mortar-makers, hod-carriers, and all others working in the sun, should have some kind of shed or shade handy, where they can rest for a few minutes at short intervals of half an hour or so. People otherwise engaged on the streets, or who have to go about on business, should be careful to keep on the shady side, to look well to their head gear, so as to insure that which is light and porous, and those who have leisure should carry sun-umbrellas. To *cure* see page 19.

SWEATING, Profuse.—An old remedy for excessive sweating is cold sage tea. It is made by taking a large teaspoonful of chopped sage leaves, and boiling them in six ounces of water for two or three minutes. The decoction is then left to stand and cool, and is strained and sweetened to the taste. This remedy has been used with benefit in the colliquative sweating, as it is called, of pulmonary consumption.

SWEATING, To Produce.—Pour alcohol into a saucer, to about half fill it; place this under a chair; strip the person, to be sweated, of all clothing, and place him in the chair, putting a comforter over him, also; now light a match and throw into the saucer of alcohol, which sets it on fire, and by the time the alcohol is burned out he will be in a profuse perspiration, if not, put in half as much more of alcohol and fire it again, which will accomplish the object; then rise up and draw the comforter around you, and get into bed, following up with hot teas and sweating drops.

SWELLING, White.—Dr. Kirkland recommends a volatile plaster for this disease, made after the following manner: Melt together in an iron ladle, or earthen pipkin, two ounces of soap and half an ounce of litharge plaster. When nearly cold, stir in one drachm of sal ammoniac, in fine powder; spread upon leather, and apply to the joint as above. If the above method fail, and ulceration take place, a surgeon should be applied to without delay.

TAPE WORM.—1. A boy, six years old, had been troubled for about a year with tapeworm, was directed to take fifteen drops of turpentine, in the form of an emulsion, three times daily, for a week, and afterward that two ounces of the kernels of pumpkin seeds be thoroughly ground up with sugar to a fine pulp, and sufficient mint water added to make an emulsion of twelve fluid ounces. This was taken in the morning, between six and seven, in divided doses, upon an empty stomach. At 9 A. M., two tablespoonfuls of castor oil were given, and at 11 A. M. the usurper rapidly beat a retreat before the advancing foe, and twenty-one feet, head and shoulders, were carefully bottled up; since which time the boy has rapidly gained in health and spirits.—2. Dr. Lurtel has tried with success the following method: He gives in one dose two-thirds of an ounce of ether, followed two hours afterwards by an ounce of castor-oil. The worm is discharged entire or almost so, and always with the head intact. No pain is caused by this treatment.

TEETHING.—Young children whilst cutting their first set of teeth often suffer severe constitutional disturbance. At first there is restlessness and peevishness, with slight fever, but not unfrequently these are followed by convulsive fits, as they are commonly called, which depend on the brain becoming irritated; and sometimes under this condition the child is either cut off suddenly, or the foundation of serious mischief to the brain is laid. The remedy, or rather the safeguard, against these frightful consequences is trifling, safe, and almost certain, and consists merely in lancing the gum covering the tooth which is making its way through. When teething is about it may be known by the spittle constantly drivelling from the mouth and wetting the frock. The child has its fingers often in its mouth, and bites hard any substance it can get hold of. If the gums be carefully looked at, the part where the tooth is pressing up is swollen and redder than usual; and if the finger be pressed on it the child shrinks and cries showing that the gum is tender. When these symptoms occur, the gum should be lanced, and sometimes the tooth comes through the next day, if near the surface; but if not so far advanced the cut heals and a scar forms, which is thought by some objectionable, as rendering the passage of the tooth more difficult. This, however, is untrue, for the scar will give way much more easily than the uncut gum. If the tooth does not come through after two or three days, the lancing may be repeated; and this is more especially needed if the child be very fractious, and seem in much pain. Lancing the gums is further advantageous, because it empties the inflamed part of its blood, and so relieves the pain and inflammation. The relief children experience in the course of two or three hours from the operation is often very remarkable, as they almost immediately become lively and cheerful.

TETTER.—After a slight feverish attack, lasting two or three days, clusters of small, transparent pimples, filled sometimes with a colorless, sometimes with a brownish lymph, appear on the cheeks or forehead, or on the extremities, and at times on the body. The pimples are about the size of a pea, and break after a few days, when a brown or yellow crust is formed over them, which falls off about the tenth day, leaving the skin red and irritable. The eruption is attended with heat, itching, tingling, fever and restlessness, especially at night. Ringworm is a curious form of tetter, in which the inflamed patches assume the form of a ring.—*Treatment* should consist of light diet, and gentle laxatives. If the patient be advanced in life, and feeble, a tonic will be desirable. For a wash, white vitriol, one dram; rose-water, three ounces, mixed; or an ointment made of elder-flower ointment, one ounce; oxide of zinc, one dram.

TETTER, HUMID.—This is an eruption of minute, round pimples, about the size of a pin's head, filled with colorless fluid, and terminating in scurf. It is preceded by languor, faintness, perspiration, and a pricking of the skin. Another species of this disease is called sun-heat, which is an eruption of a white or brownish color, which generally terminates in yellow scabs. It occurs only in summer, and affects those parts which are uncovered. In still another species, the eruption is attended with pain, heat, itching, intense smarting, and a swell-

ing of the affected part. When the blisters break, the water runs out, irritates and inflames the skin, which becomes red, rough, and thickened—covered sometimes with a thick crust. *Treatment*.—Low diet, cooling drinks, gentle purgatives, and warm baths. In old chronic cases, apply externally either lime-water, or corrosive sublimate in a wash proportioned of five grains to one pint of soft water. In the last two forms of the affection apply nitrate of silver in solution, to the parts.

TETTER, CRUSTED.—This eruption consists at first of slightly elevated pustules or pimples, closely congregated, with an inflamed border. These break, and the surface becomes red, excoriated, shining, and full of pores, through which a thin, unhealthy fluid is poured out, which gradually hardens into dark, yellowish-green scabs. When this tetter invades the head or scalp, it causes the hair to fall off, and is termed a scall.—*Treatment*.—Vapor-bath and water-dressing. The crusts should be removed by a weak lye, made from hard-wood ashes or potash; then an ointment should be applied, made of mild nitrate of mercury ointment, three drachms; sugar of lead, sixteen grains; rose-water ointment, one ounce.

THROAT, (SORE), Remedies for.—1. In many cases of slight soreness of the throat, it is not deemed necessary to apply to a physician for a prescription. In such cases a gargle composed of hydrochloric acid, two drams; water, six drams; and decoction of Peruvian bark, four ounces.—2. Pour a pint of boiling water upon twenty-five or thirty leaves of common sage; let the infusion stand for half an hour. Add vinegar sufficient to make it moderately acid, and honey, according to the taste. This combination of the astringent and the emollient principle seldom fails to produce the desired effect. The infusion must be used as a gargle several times a-day. It has this advantage over many gargles—it is pleasant to the taste, and may be swallowed occasionally, not only without danger, but with advantage.—3. Dissolve a teaspoonful of chlorate of potash in a tumbler of water and gargle with it. It is nearly tasteless, and not at all offensive to take, and well adapted to children.—4. Make a poultice of wormwood, boiled in sweet milk, and apply it to the throat.

TIC-DOLOREUX, To Cure.—Take half a pint of rose-water, add two teaspoonfuls of white vinegar, to form a lotion. Apply it to the part affected three or four times a day. It requires fresh linen and lotion each application; this will, in two or three days, gradually take the pain away. See also "Neuralgia".

TOE-NAILS, IN-GROWING.—This most painful of the diseases of the nails is caused by the improper manner of cutting the nail (generally of the great toe), and then wearing a narrow, badly-made shoe. The nail beginning to grow too long, and rather wide at the corners, is often trimmed around the corner, which gives temporary relief. But it then begins to grow wider in the side where it was cut off; and, as the shoe presses the flesh against the corner, the nail cuts more and more into the raw flesh, which becomes excessively tender and irritable. If this state continue long, the toe becomes more and more painful and ulcerated, and fungus (proud flesh) sprouts up from the sorest points. Walking greatly increases the suffering, till positive rest

becomes indispensable.—*Treatment*.—We omit all modes of cutting out the nail by the root, and all other cutting or torturing operations. Begin the effort at cure by simple application to the tender part of a small quantity of perchloride of iron. It is found in drug stores in a fluid form, though sometimes in powder. There is immediately a moderate sensation of pain, constriction, or burning. In a few minutes the tender surface is felt to be dried up, tanned, or mummified, and it ceases to be painful. The patient, who before could not put his foot to the floor, now finds that he can walk upon it without pain. By permitting the hardened, wood-like flesh to remain for two or three weeks, it can be easily removed by soaking the foot in warm water. A new and healthy structure is found, firm and solid, below. If thereafter the nails be no more cut around the corners or sides, but always curved in across the front end, they will in future grow only straight forwards; and by wearing a shoe of reasonably good size and shape, all further trouble will be avoided.

Another method is with a knife, or a piece of glass, scrape the centre of the nail until it becomes almost as thin as the thinnest paper; then cut the nail in the form of a crescent, the convex side being inward. This will compel the sides of the nail to grow outward in the natural way.

TOOTHACHE, Remedies for.—1. One drachm of alum reduced to an impalpable powder, three drachms of nitrous spirit of ether, mix, and apply them to the tooth on cotton.—2. Mix a little salt and alum, equal portions, grind it fine, wet a little lock of cotton, fill it with the powder and put it in your tooth. One or two applications seldom fail to cure.—3. To one drachm of colloidion add two drachms of Calvert's carbolic acid. A gelatinous mass is precipitated, a small portion of which, inserted in the cavity of an aching tooth, invariably gives immediate relief.—4. Saturate a small bit of clean cotton wool with a strong solution of ammonia, and applying it immediately to the affected tooth. The pleasing contrast instantaneously produced in some cases causes a fit of laughter, although a moment previous extreme suffering and anguish prevailed.—5. Sometimes a sound tooth aches from sympathy of the nerves of the face with other nerves. But when tooth-ache proceeds from a decayed tooth either have it taken out, or put hot fomentations upon the face, and hot drinks into the mouth, such as tincture of cayenne.

TRICHINA.—Trichina is the term applied to a minute animal (parasite) known for some time to have existed in the muscles of man, and which could be bred in the muscles of some other mammals by feeding them with it. More recently it has been discovered to occur naturally in the muscles of swine. It is a minute, slender, and transparent worm, scarcely 1-20th of an inch in length. After this animal becomes introduced into the stomach of man, or other animals susceptible to its ravages, and which may feed upon flesh infected with it, the worms become freed from their capsules by the action of the digestive fluid, and range freely in the stomach and intestines of the custodian. Their development proceeds rapidly, and procreation takes place within 4 or 5 days; each female gives birth to from 60 to 100 young, and dies soon after. The young thread-like worm remains for a short time within the lining membrane of the intestines, causing

irritation, diarrhoea, and sometimes death if present in sufficient numbers. After attaining a proper size and strength, these young trichinae begin to penetrate the walls of the intestines, and make their way toward their proper homes, the voluntary muscles. In traversing the muscles they do not seem to penetrate the fibre of the muscle, but to wind their way between them. At this time they cause to those afflicted great muscular pain and soreness, cramps, and even tetanic symptoms. After about 4 weeks migration they commence to encyst themselves in the muscular fibre, none having ever been found encysted in fat or the other tissues. They perforate the walls of the fibre selected as their abode, pass into it, and fasten themselves in the space so made. The worm then secretes a delicate membranous sac, which finally becomes calcareous by still further secretions. It is only in man, however, that these calcareous cysts have been observed, hogs being usually killed long before time has elapsed for the accumulation of sufficient lime. The young trichina having now reached its torpid stage, it will so remain during the lifetime of its custodian. It feeds no longer, but goes on slowly in development until it has reached the condition of puberty, and then awaits its chances of freedom to "commence its cycle." They can breed but once in the body of one and the same animal.

There is no cure when once they find a lodgement in the human body, so that prevention is a necessity to all who would avoid dying by trichina. And prevention is only secured by not eating pork. Hog's are the scavengers of all creation, fit only "to cast out devils in" and no man or woman, of fine tastes, unless they are on the verge of starvation will eat pork. Whatever may be your religion, be a Jew in your regard for pork, and trichina, scrofula and other foul humors will never come near you.

URINE, Suppression of.—In this disease there is urine in the bladder, but it is retained from some inability to pass it. There are several causes of suppression, and the treatment must vary accordingly. If inflammation of the neck of the bladder has caused it, warm fomentations should be applied, and warm hipbaths. Three or four drops of Croton oil may be rubbed on, to bring out an eruption. Cooling diuretics, as infusions of marshmallow, buchu, or pumpkin-seeds, should be used.

URINE, Inability to hold.—This is quite common among children, but is not common in adult life except among the old. It is caused by irritation of the roots of the spinal nerves which go to the bladder, mechanical injuries of the bladder, palsy of the bladder, debility of the neck of the bladder, general weakness of the nervous system, worms in the bowels, whites, and gravel.—**Treatment.**—Pains should be taken to create a healthy action of the skin by bathing and rubbing, and, if in children, not much drink should be allowed them. When it proceeds from debility, the compound infusion of the trailing arbutus, and a custard made of isinglass, may be used freely. Sometimes cold water douched upon the back, or a stimulating plaster, will do good when the disease is from weak nerves.

VOMITING.—Where vomiting is not a part of some particular disease and treated along with it, or where it persists very obstinately, it may require the sixth or quarter of a grain of morphia

to check it. But generally some aromatic, as ginger, spearmint, peppermint, or spice-tea will put an end to it. A cordial or stimulant, as brandy, champagne, tincture of ginger, pargoric, or strong coffee without milk or sugar, will answer as well. If caused by irritability of the stomach, a pill of extract of belladonna and ipecac, will answer to quiet the disturbance. The patient should lie still in bed, and in bad cases a mustard-poultice on the stomach may be needed. The vomiting of children may be quieted by wetting a cloth in laudanum, and laying it on the stomach.

In cases of sea-sickness, the patient should lie upon deck, in the open air if possible. A wine-glass of brandy, or from ten to forty drops of laudanum, will relieve the sickness very much. Ten drops of hartshorn, in a half-tumbler of water, is very good. But the best-known remedy is chloroform, taken in doses of from forty to eighty drops, suspended in water by means of a little gum-arabic.

WATER BRASH.—This consists in a discharge from the stomach, generally in the morning, of a thin, glairy fluid, sometimes insipid, often sweetish, and at other times, sour. A burning heat or pain of the stomach attends it, and seems to cause the discharge. The amount thrown up varies from a spoonful to a pint or more. The complaint is caused by a poor, nutritive diet, or by whatever causes the blood to become thin and watery.—**Treatment.**—Ten or fifteen drops of ammonia-water, in half a tumblerful of cold water, will quiet the distress, and stop the discharge. The best remedy for this discharge, is the trisnitrate of bismuth, taken at meal times, three times a day, in thirty-grain doses. The tincture of nuxvomica is good. The blood should be restored by tonics of some preparation of iron, and the food should be nourishing and digestible.

WARTS, To Cure.—Warts are formed by the small arteries, veins, and nerves united together, taking on a disposition to grow by extending themselves upward, carrying the scarf-skin along with them, which thickening forms a wart. Corns are a similar growth, brought about by the friction of tight boots and shoes.—1. Take a piece of diachylon plaster, cut a hole in the centre the size of the wart, and stick it on, the wart protruding through. Then touch it daily with aquafortis, or nitrate of silver. They may be removed by tying a string tightly around them.—2. Take a blacksmith's punch, heat it red hot and burn the warts with the end of it. When the burn gets well the warts will be gone forever.—3. Scrape down enough dry cobwebs to make a ball large enough to a little more than cover the wart and not touch the flesh around the same; lay it on top of the wart, ignite it, and let it be until it is all burnt up. The wart will turn white, and in a few days come out.—4. Pass a pin through the wart; apply one end of the pin to the flame of a lamp; hold it there until the wart fries under the action of the heat. A wart so treated will leave.—5. Dissolve as much common washing soda as the water will take up; wash the warts with this for a minute or two, and let them dry without wiping. Keep the water in a bottle and repeat the washing often, and it will take away the largest warts.—6. They may be cured surely by paring them down until the blood comes slightly and then rubbing them with lunar

caustic. It is needless to say this hurts a little, but is a sure cure. The hydrochlorate of lime applied in the same way will cure after several applications and some patience; so will strong wood vinegar, and so it is said will milk weed. The cures founded upon superstitious practices such as muttering some phrases over the excrescence, stealing a piece of beef, rubbing the wart therewith and then burying it under the leaves to await its decay, etc., etc., are all the remnants of a past state of ignorance and are of no use whatever. Warts are generally only temporary and disappear as their possessors grow up.

WENS, To Cure.—Dissolve copperas in water to make it very strong; now take a pin, needle, or sharp knife, and prick, or cut the wen in about a dozen places, just sufficient to cause it to bleed; then wet it thoroughly with the copperas water, once daily.

WHITLOW.—There are very few affections that commence so simply but afterwards become so painful and serious in their results as whitlow. It is most frequently found in people in a low state of health, and in nervous and delicate females. The commencement of an attack is generally marked by pain and redness in the finger, or palm of the hand, as the case may be. The pain, slight at first, becomes gradually more intense and throbbing, and entirely prevents sleep. The patient suffers from loss of appetite, and falls into an irritable state from the constant pain and want of sleep, and in some severe cases, unless relief is obtained, delirium may come on. Whitlow is sometimes found as a consequence of certain constitutional diseases, and may also be caused by wounds from a thorn, a splinter of wood, a rusty nail, or the sting of a fish. The latter is a common cause amongst fishermen. For a cure see "Felon".

WORMS.—In grown persons the symptoms of worms are quite obscure, except an intolerable itching within the anus, which generally indicates pin-worms, which live in the rectum. In children, worms, are indicated by paleness, itching of the nose, grinding of the teeth, and starting in sleep; irregular appetite, bad breath, swelled upper lip, picking of the nose, and hard, swelled belly, and one cheek constantly flushed. — 1. Spirits of turpentine, half an ounce; oil of anise, half an ounce; castor oil; one ounce; wormseed oil, one ounce. Mix. The dose is, for a child of one or two years, ten to twenty drops, every two or three hours. In three days a brisk physic should be given. — 2. Carolina pink-root, sena leaf, manna, and American worm-seed, of each $\frac{1}{2}$ ounce; bruise and pour on boiling water 1 pt.; and steep without boiling. Sweeten well, add half as much milk. Dose—A child of five years, may take 1 gill 3 times daily, before meals, or sufficient to move the bowels rather freely.—

3. Steep or boil in a pewter vessel, over a moderate fire, very strong, the bark of spotted alder or witch-hazel. For a year old, a tablespoonful; increase the dose according to age. Give four or five times a day, for several days. It is sure and safe. Or fine powdered sage, mixed with honey; a teaspoonful for a dose. Sweetened milk, with the addition of a little alum, will turn the worms. Flour and sulphur, mixed with honey, is very good. Heat very hot, in a smith's furnace, a piece of steel; lay on it a roll of brimstone, melt the steel, let it fall into water, and it will be in round lumps. Pound them very fine, mix the dust with molasses. Give half a teaspoonful night and morning, fasting. Or, give as much as will lie on a sixpence, of dried mandrake roots, powdered and mixed with honey, in the morning, three or four times successively. If a child have fits, proceeding from worms, give as much paregoric as it can bear; it will turn the worms, and ease the child. To prevent worms, let children eat onions, raw or cooked. Raw are the best. Salt and water will turn worms, and a dose or two of flour and sulphur after, will bring them away, without any other medicine.

WOUNDS, Treatment by Ventilation.—This consists, in fact, of leaving small wounds exposed to the air, and in acting on large ones by means of the domestic bellows for a period varying from five to twenty minutes, every two, three or four hours, according to the discharge and moisture that may be present. The object is to secure the formation of a crust over the surface of the wounds under which healing takes place far more rapidly than when the surface is not so protected; and hence the application of the air must be sufficiently frequent and prolonged to keep up this crust of a certain thickness. When the crust is hard, however, it must be displaced and another formed, and when the discharge is very abundant, the alcoholic dressings, now so much in vogue, in the Paris hospitals, should, for a while, precede the ventilation. The influence of this last in improving the condition of the wound is almost immediate, a disposition to cicatrize and a diminution of the discharge soon being apparent. In burns of the second and third degree, which assume the appearance of a simple denuded wound, ventilation may advantageously supersede cotton and other impermeable applications. This treatment is not suited to deep or penetrating wounds. Among the secondary advantages of the treatment by ventilation, originating with M. Boisson, may be mentioned its simplicity, its easy applicability by the patient or his friends, its economy and its cleanliness. It substitutes a dry for a moist surface, diminishing the chance of putrid decomposition and of infection of the surrounding atmosphere.

ORNAMENTAL WORK.

ANGLO-JAPANESE WORK.—This is an elegant and easy domestic art. Take yellow, withered leaves, dissolve gum, get mixed black paint and some copal varnish, etc. Any articles

may be ornamented with these simple materials—an old work-box, tea caddy, fire screen, flower pots, etc. Select perfect leaves, dry and press them between the leaves of books, rub the sur-

face of the article to be ornamented with fine sand paper; then give it a coat of fine black paint, which should be procured mixed at a color shop. When dry, rub smooth with pumice stone; then apply two other coats. Dry; arrange leaves in any order, according to taste. Gum the leaves on the under side, and press them upon their places. Then dissolve some isinglass in hot water, and brush it over the work while the solution is warm; when dry, give three coats of copal varnish, allowing ample time for each coat to dry. Articles thus ornamented last for years, and are very pleasing.

ANTIQUÉ PAINTING.—Apply with a stiff brush a very thin coat of Antique varnish, which will be thoroughly dry in six hours; then apply another coat of the same, thin and very equal and smooth; allow this to dry one hour or until nearly dry, strongly adhering to the finger when touched, but not sticky. Then put on the engraving, (having dampened it thoroughly with warm water, not too wet, absorbing the extra moisture with a cloth or blotter,) with the face to the varnished side of the glass; press it gently until every part adheres to the surface, rub carefully with your finger a part of the figure, being sure not to rub through the engraving; after it has dried twelve hours, wet again and rub off all the paper leaving only the engraving; when again dry moisten carefully with fine bleached drying oil. It is then fit for painting. The colors will strike through very freely, as there is no paper left, and will not spot as the Grecian is liable to do. Do not use any Turpentine in this style. The Directions are the same as for Grecian Painting, except more pains should be taken to shade and blend in the colors, to help the shading in the engraving, particularly the flesh-color with the hair.

BOTANICAL SPECIMENS, To Dry for Preservation.—The plants you wish to preserve should be gathered when the weather is dry; and after placing the ends in water, let them remain in a cool place till the next day. When about to be submitted to the process of drying, place each plant between several sheets of blotting paper, and iron it with a large smooth heater pretty strongly warmed, till all the moisture is dissipated. Colors may thus be fixed which otherwise become pale or nearly white.

Some plants require more moderate heat than others, and herein consists the nicety of the experiment; but I have generally found, that if the iron be not too hot, and is passed rapidly, yet carefully, over the surface of the blotting paper, it answers the purpose equally well with plants of almost every variety of hue and thickness. In compound flowers, with those also of a stubborn and solid form, some little care and skill are required in cutting away the under part, by which means the profile and forms of the flowers will be more distinctly exhibited. This is especially necessary when the method employed by Major Velez is adopted, viz., to fix the flowers and fruit down securely with gum upon the paper, previous to ironing, by which means they become almost incorporated with the surface. When this very delicate process is attempted, blotting paper should be laid under every part excepting the blossoms, in order to prevent staining the white paper. Great care must be taken to keep preserved specimens in a dry place, and also to handle them gently; and thus they

can be kept a long time, affording a source of great pleasure.

BOUQUETS of Colored Grass.—The grasses should be gathered while the seeds are green, so that after having been hung in a dry, dark place a week or two, or until thoroughly dried, the seed will not rattle off when shaken. The finer seeded the grasses the handsomer the bouquets; and yet sprigs of green oats work up tastily.

The ingredients required are simple and cheap, viz.: Common starch and dry chrome paints of as many colors as you wish; an ounce of each is sufficient for making a good sized bouquet. Dissolve in cold water three tablespoonfuls of starch; then pour on boiling water until cooked; let cool; arrange upon the table your paints, grasses and starch. Into the starch dip the sprays required for the several colors, shake, and then brush into the paint of whatever color you wish; shake again and lay them one side upon a board or convenient place to let remain undisturbed until dry. Serve the sprays for each different color in the same way. When dry, lightly shake off the surplus paint, if any, and then form into bouquets. These, particularly when used in connection with crystallized grasses and put into a nicely made wall-basket, of shield form, and hung upon the wall, or even into a vase, are well worth the "care and trouble" of making.

CONE WORK.—Select good clear cones, and dissect some which have handsome, large scales, and brush them clean; lay nice white putty, or a similar adhesive substance, smoothly on your frame; set into this putty whole cones, large and small, in such figures as suit your taste, and fill up the entire groundwork with the scales, lapping one neatly over the other.

Cut oval and round frames for light pictures, from bookbinder's pasteboard, and cover with the scales in layers or rows. Scallop the edges with small whole cones, set in large cones surrounded by little ones equidistant, if the frame be broad, and fill in with the scales. When dry, take out those which are not firm, and replace. Add acorns ad libitum. Varnish the whole once or twice. If you wish something nice, go over every part with a fine brush, and leave no varnish standing in drops.

Cones can be found by almost any one in an hour's walk through pine woods. Indeed, if one has a taste for the beautiful, and is quick in perception, it is impossible to ramble through wood and fields without finding many curiosities in the shape of mosses, grasses, cones, etc.

FUNGI, To Preserve.—Take two ounces of sulphate of copper, or blue vitriol, and reduce it to powder, and pour upon it a pint of boiling water, and when cold, add half a pint of spirits of wine; cork it well, and call it "the pickle." To eight pints of water add one pint and a half of spirits of wine, and call it "the liquor." Be provided with a number of wide-mouthed bottles of different sizes, all well fitted with corks. The fungi should be left on the table as long as possible, to allow the moisture to evaporate; they should then be placed in the pickle for three hours, or longer, if necessary; then place them in the bottles intended for their reception, and fill with the liquor. They should then be well corked and sealed, and arranged in order with their names in front of the bottles.

DECALCOMANIA—Or the Art of Ornamenting China, Glass, Earthenware, Wooden-

ware, Fancy Boxes, Ivory, and Paper Mache Goods, Japannedware, Binding of Books, Fans, Leather Work, etc., etc. — *Directions.* — Cover the picture entirely (taking care not to go beyond the outlines) with a slight coat of fixing varnish; then put the picture on the object to be ornamented, being careful to place it properly at once, in order not to spoil it by moving. The varnish newly applied being too liquid, the picture should be left to dry eight or ten minutes, and placed on the object to be ornamented, when just damp enough to be still adherent: this done, cover the back of the picture with a piece of cloth steeped in water, then, by means of a knife or pen-holder, rub it all over, so as to fix every part of it; then remove the piece of cloth and rinse the paper with a paint-brush steeped in water; at the end of a few minutes the paper will come off, leaving the painting transferred.

Care must be taken that the piece of cloth, without being too wet, should be sufficiently so for the paper to be entirely saturated. The picture must now be washed with a wet paint-brush, and dried very lightly with some blotting paper. The ornamented article should, after this, be put near the stove or any other warm place, to make it dry well and to improve the adhesiveness of the pictures. The polishing varnish should not be applied until the next day, keeping the pictures in the meantime carefully out of the dust. The latter varnish should be put on as lightly as possible.

If dark-colored objects are to be ornamented, such as bindings of books, Russian leather, leather bags, etc., the picture must first be covered with a mixture of white lead and turpentine, following the outlines of the design and covering it entirely. When this coat is perfectly dry, proceed according to the above instructions.

To print on silk, paper, or materials that cannot bear washing after the process, proceed as follows: Cover the picture entirely with a light coat of fixing varnish and let it dry for an hour or two; then pass a sponge, lightly dampened, over the whole surface of the paper, in order to take away the composition which is on it in the blank parts, and which often cleans the material.

When the paper is dry, re-varnish the picture, and transfer it on to the material by means of a paper cutter, avoiding to employ the piece of cloth or anything damp; then, with a paint-brush slightly steeped in water, wet the paper lightly, and leave it a full quarter of an hour on the object before removing it.

To remove a spoiled print, rub it with a soft rag imbibed in turpentine.

Our readers will at once appreciate the merits of this invention; the facility with which it can be applied, also its numerous applications.

DIAPHANIE.—This is a process by means of which colored designs may be transferred from the paper on which they are originally printed, for the decoration in colors of glass which is intended to admit light. It is, in fact, a method of glass-staining which costs only a fraction of the expense of the ancient process, produces quite as bold and brilliant effects, is sufficiently durable for all ordinary purposes, and can be practised by amateurs of either sex at their own homes. That diaphanie fully answers the purpose for which it is mainly intended—the staining of glass—is abundantly proved by the fact that many church windows are colored by

means of it, and that they are esteemed quite as telling and beautiful specimens of decoration as those that owe their origin to the old and expensive art. For ordinary purposes the process may be described in a few words. In the first place, designs must be obtained, and these can be got in every variety, and suitable for any size of window or pane. First wet the back, or the uncolored side, with a sponge and cold water, and apply a coating of prepared transferring varnish to the colored surface with a wide camel-hair brush. Then at once apply the cemented side to the glass in the proper position, and press down with a roller. To insure success, two or three sheets of paper should be laid upon the back of the design before the using of the roller is commenced; then begin rolling from the centre outward to the circumference. The work is now to be left until the varnish has become perfectly dry, which it will do in two days. The design has by this time become printed upon the glass, and the next step is to remove the paper from which the design has been transferred. This is done by wetting and gently rubbing with a cloth or sponge. When the paper has been wholly removed, a thin coating of "clearing liquid" is applied to the design, and when this has become perfectly dry, one or two coatings of the "washable varnish" are laid on, and the work is finished.

No special knowledge of art is required for the practise of diaphanie. The work is especially suitable for hall and lobby doors and windows, for school and church windows, staircase, study, and other windows in houses where it may be desirable to shut out the prospect of a smoke-dried back yard, or a range of mews. The special advantage of diaphanie is that while imparting a graceful and artistic character wherever used, it does not exclude the light, and it renders blinds unnecessary.

It should be specially kept in view that the designs must be transferred before the glass is fitted to the window, and that the colored side is kept inwards. The glass may be cleaned in the usual manner, if ordinary care be taken, as the coatings of "washable varnish" are quite a sufficient protection to the picture.

GAS-LIGHT PICTURES.—Cut all the white paper close up to the engraving, and place the engraving on the glass, like the Antique Painting, then paint a wreath around the engraving, on the glass, oval shape or round. Make a back-ground by painting the back board with white paint, and before it dries take white or blue frosting, a pinch at a time, with the fingers and scatter thickly all over the painted board. When the board is dry, shake off what frosting there is that does not adhere, and save it for the next time. A sufficient quantity will adhere to present the appearance of myriads of diamonds, and is very effective, especially by gas-light. In putting the back board on the picture in this style, put paste-board strips or thin wood between the glass and the back to keep the glass from mashing down the frosting.

GRASSES, To Crystalize.—Pulverize a pound of the best white alum, and dissolve it over a slow fire in a quart of pure, soft water. Do not let it boil, and be careful to keep everything out of the solution that would possibly stain it, for the beauty of the grasses depends on the pure whiteness of the crystals. A new earthen bowl

is the best dish for the purpose; when the alum is dissolved, let the solution cool down to blood heat; meanwhile arrange your grasses in the bowl and pour the solution over them; cover up and set away for twenty-four hours. Then take them out carefully, dry them in the sun four or five hours, and put them in the vase prepared for them.

If you form the grasses, etc., into a bouquet before crystalizing them, procure a glazed earthen jar, suspend the bouquet from a stick laid across the top of the jar, take care that the tops of the grasses are not bent or doubled over, and then pour on the solution, proceeding as above directed. What remains of the alum water may be reheated, tinged blue, or purple, or scarlet, by a few drops of dye, and used as before.

Of course the same preparation is suitable for all kinds of plants.

GRECIAN PAINTING.—Procure a light pine frame, a trifle larger than the Engraving: (this need not be of the nicest workmanship; simply 4 pieces of wood nailed together, to act as a support to the picture while painting) then moisten your Engraving with water, and while wet, paste it to the frame, dry slowly, not over a fire, and it will become quite smooth and tight; now, moisten again on the wrong side with pure Spirits of Turpentine, and while wet, with a coat of Grecian Varnish on the same side, which continue to apply (keeping damp only, not too wet, or it will filter through in spots,) until it is wholly transparent and without spots. If it is found difficult to remove the spots, apply the second coat of Spirits and afterwards the Grecian Varnish. When ready to paint, the back will have an even gloss all over it. When perfectly clear it should remain two or three days before painting, which is done on the side that you have varnished, the shading of the Engraving serving the same purpose in painting; this process is so simple that a child able to read this can understand it. Varnish the picture but once, on the face after it is framed, (not before,) with outside varnish; this must be put on evenly, and with care that it does not run; have but little in the brush at a time.

LEAF IN COPPER. *To make a Fac-Simile of.*—This beautiful experiment can be performed by any person in possession of a common galvanic battery. The process is as follows:—Softens a piece of gutta-percha over a candle, or before a fire; knead it with the moist fingers upon a table, until the surface is large enough to cover the leaf to be copied; lay the leaf flat upon the surface, and press every part well into the gum. In about five minutes the leaf may be removed, when, if the operation has been carefully performed a perfect impression of the leaf will be made on the gutta-percha. This must now be attached to the wire in connection with the zinc end of the battery (which can easily be done by heating the end of the wire, and pressing it into the gutta-percha), dusted well over with the best black lead, with a camel's hair brush—the object of which is to render it a conductor of electricity, and then completely immersed in a saturated solution of sulphate of copper. A piece of copper attached to the wire in connection with the copper end of the battery, must also be inserted into the copper solution, facing the gutta-percha, but not touching it; this not only acts as a conductor to the electricity, but also maintains the solution

of copper of a permanent strength. In a short time the copper will be found to creep over the whole surface of the gutta-percha, and in about twenty-four hours, a thick deposit of copper will be obtained, which may then be detached from the mould. The accuracy with which a leaf may thus be cast is truly surprising.

Casts taken in this way delineate every fiber and nerve, in fact, the minutest arts, with the greatest fidelity.

LEAVES, PLANTS, ETC., To Take Impression of.—Take half a sheet of fine wove paper and oil it well with sweet oil; after it has stood a minute or two, to let it soak through, rub off the superfluous oil with a piece of paper, and let it hang in the air to dry; after the oil is pretty well dried in, take a lighted candle, and move the paper over it, in a horizontal direction, so as to touch the flame, till it is perfectly black.—When you wish to take off impressions of plants, lay your plant carefully on the oiled paper, lay a piece of clean paper over it, and rub it with your finger equally in all parts for half a minute; then take up your plant and be careful not to disturb the order of the leaves, and place it on the paper on which you wish to have the impression; then cover it with a piece of blotting paper, and rub it with your finger for a short time, and you will have an impression superior to the finest engraving. The same piece of black paper will serve to take off a great number of impressions. The principal excellence of this method is, that the paper receives the impression of the most minute veins and hairs, so that you obtain the general character of most flowers. The impression may afterwards be colored.

LEAVES, SKELETON.—Skeleton leaves are among the most beautiful objects in nature, and as they can be arranged either in groups under glass shades, made into pictures, as it were, and hung against the wall, or placed in either blank-books or albums, they come within the means of all, and can be used to decorate the palace or the cottage. The most suitable leaves for the purpose are those from what botanists call exogenous plants, and may be known by the veins of the leaf branching from a central vein or midrib; those from endogenous plants rising from the base and curving towards the apex of the leaf. The object in view is to destroy what may be called the fleshy-part of the leaf, as well as the skin, leaving only the ribs or veins.

The most successful, and probably the simplest, way to do this is to macerate the leaves in rain-water till they are decomposed. For this purpose, when the leaves are collected they should be placed in an earthen-ware pan or a wooden tub, kept covered with rain-water, and allowed to stand in the sun. In about a fortnight's time they should be examined, and if found pulpy and decaying, will be ready for skeletonizing, for which process some cards, a camel's-hair brush, as well as one rather stiff (a tooth-brush, for instance), will be required. When all is prepared, gently float a leaf on to a card, and with the soft brush carefully remove the skin. Have ready a basin of clean water, and when the skin of one side is completely removed, reverse the card in the water, and slip it under the leaf, so that the other side is uppermost. Brush this to remove the skin, when the fleshy part will most likely come with it; but if not, it will readily wash out in the basin of water.

fringe of yellow paper for stamens. Make your leaves and calyx of green tissue paper, well sized with gum. Cover fine well-annealed wire with green paper for stalks, and fasten the parts of the flower together with gum.

For a daisy, chrysanthemum, or aster, double the paper two or three times; cut down two thirds; roll the uncut side firmly round and round the bent end of a piece of wire suitable for the stalk.

Buds, pericarps, etc., are made either by stuffing with a bit of cotton, or winding up paper.

Variegated pinks look well. Paint strips of paper in plashes here and there, as you see on the petal of the carnation—some very dark carmine, some merely light touches. Cut off suitable width for petals, and wind around a paper center. Take natural flowers for models.

PEARL WORK (*Imitation*), for *Embroidery*.—We do not think that a preparation of fish scales has ever been used in this country instead of the so much admired pearl; and so we give it to our readers, knowing that they will like something entirely new.

Take the shining scales from a carp, or any other fish—the larger the scales, the better; put them in strong salt water over night; lay them on a linen cloth or smooth board; wipe them carefully on both sides, and lay them between clean, strong paper, under a board, on which place a weight; let them remain a day or two, until the scales are pressed dry and become hard. Draw something, say an ivy leaf, on strong drawing paper; cut it out, and lay it on each scale as a pattern, by which to cut the scales with very fine scissors. Such a pattern however, is superfluous to persons acquainted with drawing, who can cut leaves of that kind without one. Vein your scale leaves with a fine steel needle; do it slowly, bearing on hard to give clearness; the leaves are now ready.

Stretch a rich, dark-colored silk velvet tightly in an embroidery frame; place the pattern, which you intend to copy, before you, and imitate it by sewing the scale leaves, one at a time, on the velvet, with fine gold thread, and the leaf stalks and tendrils embroidered with the same. It is well to draw the thread through water before using it, to render it flexible.

The beautiful effect produced by this simple process fully repays one for the trouble. That manifold changes may be made according to the taste and ingenuity of the copyist, is evident to the reader.

POTCHIMONI.—Take plain glass jars or vases, in any shape, and clean them thoroughly; then obtain two or three sheets of figures, flowers, or views, in imitation of Chinese, Egyptian, or Swiss painting. These goods, as well as the jars, can be obtained in any of the principal cities. Now, in whatever style you determine to ornament your vase or jar in, cut out the figures from your sheet and secure them in different parts inside the jar, with the figures looking outwards. The best material for making them adhere is to boil a piece of parchment; this makes a good size. Having secured the prints, make a varnish of balsam of fir and turpentine, and apply all over inside with a fine brush. When the first coat is dry, give another coat; now take any color you choose—black, blue, green, yellow, white, pink, brown or red—and grind the paint fine with the best white varnish, and apply a coat of this paint over the whole inside; let it dry,

and then repeat coat upon coat until the color is sufficiently strong to show even and bright outside. Jars and vases may be decorated in endless variety by this method. Some use cuttings of prints, silks, etc.

SHELL WORK.—This is very pretty for vases, frames, boxes, etc. Many shell flowers, animals, birds, and the like, are brought here from the Mediterranean. We have seen some that we would like to own; but in general they have a stiff appearance. However, we will tell you how they are made.

Assort your shells according to size and color—the more rice and other small shells you have, the better. Melt white wax and glue together, two parts of the former and one of the latter. Have a clear idea of what you intend to do; or, what is better, make a pattern before you begin to set your shells. If you will ornament a box, a rose in the center looks well. Take thin round shells, those most resembling rose leaves, of the smaller size, and dipping the lower ends in the hot wax mixture, set them close together for the center of a rose; place other similar shaped shells around in circles, the largest outward. Care must be taken to form the shells into perfect circles, and to take up wax enough to make them adhere to the cover. Shells of different form, say more oblong, can be used for leaves. After arranging such figures as you like with the shells you have, fill up the spaces with the very small ones. Rice shells are the prettiest, but they are costly. Some prefer sticking the shells into a puttied surface, which does very well. Varnish with a very little copal varnish, using great care.

SHELLS, Etching.—It is done simply by means of acids. The parts not to be acted upon must be protected by a so-called etching-ground, which is nothing but a thin layer of varnish blackened in a flame so as to see plainly the figures afterward drawn on it. Be careful when doing this to make a clear drawing or writing in which the shell is exposed at the bottom of every line, as any remaining varnish would protect those parts, and the writing would not be brought out. The acid, either strong acetic, diluted nitric, or hydro-chloric, is then applied, and when its action is sufficient it is washed off with water, the varnish is rubbed off with turpentine or alcohol; when the drawing or lettering will appear, and look as if cut in with an engraver's tool. You may also make your design with varnish on the shell by means of a fine brush, then the acid will dissolve the surface around the lines drawn, when the writing will appear in relief, the letters being elevated in place of being sunk in as by the former process. The latter is the more common way in which these shells are treated. This method is applied to many other objects; all that is wanted being a liquid dissolving the material to be acted upon, and a varnish to protect some parts from its action.

THEOREM PAINTING.—This style of painting has been called Oriental Painting, and several other names. It is best adapted to fruits, birds, etc. It enables you to paint on paper, silk, velvet, crape, and light-colored wood.

To Make Horn Paper.—Take equal parts mastic and Japan varnish; add to it half as much balsam of fir as there is of either of the varnishes, and a piece of white wax the size of a thimble; simmer together till the wax is melted. If it is too thick, add a little spirits of turpentine.—Put

it on one side of the paper while it is warm, the paper having previously been prepared with painters' oil, to make it transparent. The oil must be put upon both sides rather warm, and the whole of the paper lie together one night; then wiped with a cloth to absorb the oil on the surface, and dried one week in the sun before varnishing. Each side of the paper must be varnished twice, and the greatest care taken to dry it well.

Trace the picture to be copied on white paper with a soft lead pencil, and mark those parts which do not touch each other with a figure 1. Mark another piece of horn paper for theorem 2, and cut again. Thus continue till you have enough theorems for your whole picture. It takes more time to cut a set of theorems nicely than to draw one picture; but a good set of theorems is equal to twenty or thirty sketches, and the durability depends upon the care with which you treat them. You need a brush for every color used; of course, you must have plenty of stiff brushes. Put a few drops of water on your palette with the end of the brush, to avoid dipping the bristles in water.

Lay the theorem on the paper to be painted. Good drawing paper is best for the first attempt. Press the theorem firmly down at each corner with weights, and then proceed to paint. Commence with a leaf; take plenty of paint, a very little moist, on your brush, and paint in the cut leaf of the theorem; hold the brush upright, and work quickly with a circular motion. Commence a little distance from, and work towards, the edges. If you take enough paint, it goes on smoothly; if too much, it looks dauby; if too little, spotted. In shading leaves, cut bits of horn paper on the edge, in the form of large veins, and laying on the leaf already painted, paint from this edge into the leaf. Slip the paper and paint other vained parts the same way. If successful with leaf, try a grape, which paint first purple, then blue, and finish with carmine. On removing the last of your theorem, if you see any irregularity in the painted parts, lay the theorem on again, and correct; if any spaces, dot in with a fine brush. All fibers, stalks, dots, etc., must be put in with camel's hair pencils. To lighten the effect, paint may be stuck on here and there with a stiff brush, and the edges blended together to produce softness.

To Paint on Wood.—Choose hard wood of light color; paint as above, and varnish when done.

To Paint on Velvet.—Use firm white cotton velvet. Use paint a little more moistened.

To Paint on Silk, Satin, and Crape.—Size the parts to be painted with gum arabic or isinglass, and proceed as with drawing paper. In this way ball dresses may be painted with belt and neck ribbon to match; also white crape dresses, with vines of gold and silver.

TRANSFERRING, To Glass.—Colored or plain engravings, photographs, lithographs, water colors, oil colors, crayons, steel plates, news-

paper cuts, mezzotints, pencil, writing, show cards, labels—or, in fact, anything.

Directions.—Take glass that is perfectly clear—window glass will answer; clean it thoroughly; then varnish it, taking care to have it perfectly smooth; place it where it will be entirely free from dust; let it stand over night; then take your engraving, lay it in clear water until it is wet through, (say ten or fifteen minutes) then lay it upon a newspaper, that the moisture may dry from the surface and still keep the other side damp. Immediately varnish your glass the second time; then place your engraving on it, pressing it down firmly, so as to exclude every particle of air; next rub the paper from the back until it is of uniform thickness—so thin that you can see through it; then varnish it the third time and let it dry.

Materials used for the above Art.—Take two ounces balsam of fir to one ounce of spirits of turpentine; apply with a camel's hair brush.

TRANSFERRING, To Wood.—Dissolve salt in soft water; float your engraving on the surface, picture side up; let it remain about one hour. Your screen box or table should be of bird's-eye maple, or other light-colored hard wood; varnish with best copal or transfer varnish.

Take the picture from the water; dry a little between linen rags; then put the engraving, picture side down, on the varnished wood, and smooth it nicely. If the picture entirely covers the wood after the margin is cut off, so that no varnish be exposed, lay over it a thin board and heavy weight; leave it thus in press over night. If you wish but a small picture in the centre of your wood, apply the varnish only to a space the size of your picture. Dip your fore-finger in salt and water, and commence with rubbing off the paper; the nearer you come to the engraving, the more careful you must be, as a hole would spoil your work.—Rub slowly and patiently till you have taken off every bit of the paper and left only the black lines and touches of your picture on the wood, in an inverted direction. Finish up with two or three coats of copal varnish.

TRANSPARENCIES, To Make.—Take some prettily colored landscape and cut a slit into the broad lights of it with a penknife; put a white paper of medium thickness behind it, and interline with orange or rose-colored paper; bind the three—that is, the landscape, the colored paper, and the paper which forms the back—together with some suitable color for a frame; now separate the cut edges of your landscape by pressing them apart. Hang up in the window, and when the sun shines through, the effect is beautiful. Try it; we are sure you will be pleased.

An engraving prepared as for Grecian painting is very pretty for a screen, or to hang in the window. Lamp shades may be made in this way, and many pretty designs will suggest themselves; bouquets, wreaths, vines, running round the shade, etc. Also still more beautiful is the antique style, before painting.

PAINTING AND PAPERING,

INCLUDING, VARNISHING, POLISHING, STAINING AND GILDING.

BLACKS.—*Lamp Black*, is merely the smoke from various substances. The best is from coal tar. This is the best black for all common painting. — *Ivory Black*, or bone black, is only charred bone. It has not the body, nor does it work as freely as lamp black. — *Asphaltum*, although so very transparent, is, when several coats are laid on, a most intense black, but not of much service when exposed to the weather. It is best used dissolved in turpentine, slightly warm, with or without a little boiled oil. Without the oil, it dries very quick; with it, much slower. It makes the black varnish used for japanning tin and other metals. Gum asphaltum is gathered from the surface of the Dead Sea, or the Lake Asphaltites, in Judea.

BLUES.—Copper is the base of most blues, though some are formed from iron and cobalt. — *Prussian Blue* is properly a ferrocyanuret of iron, produced by various processes. As a vehicle, dried or calcined blood and horns and hoofs are used. — There are other methods, where animal matter is not used, in which pearlash, coke, and iron-filings form the compound. It is also chemically prepared with sulphate of iron and prussiate of potash; but in all these preparations the composition is iron and prussic acid. The prussic acid, however, is not in sufficient quantity to make the color in the least degree poisonous. — *Ultramarine*. This beautiful blue was formerly made from lazulite, the beautiful variegated blue mineral, and was once worth, in Italy, twenty-five dollars an ounce. That used in the arts now is composed of carbonate of soda, sulphur, and kaolin, colored with cobalt. This color has but little body as an oil color, but is of a most brilliant hue, and wears about as well as the Prussian blue. In oil it is a transparent color, but is more dense in distemper, and covers better.

BLUE, PRUSSIAN.—Potash or pearlash, 10 parts; coke, cinders, or coal, 10 parts; iron turnings, 5 parts. Grind into a coarse powder and expose for half an hour to a full red heat, in an open crucible, stirring the mixture occasionally. When the small jets of purple flame cease, which will be in about the time named, allow the mass to cool; then add water to dissolve the soluble matter, and set aside the black foot that remains for a future operation. Next filter the solution, and add sulphate of iron (copperas), five parts (dissolved), and brighten the color of the precipitate by the addition of muriatic acid. This process yields twenty-five per cent. of Prussian blue (ferrocyanide of iron) on the quantity of pure potash in the salt employed. The larger the quantity operated on, the greater the relative product.

BLUE for CEILINGS.—Boil slowly for 3 hours 1 lb. blue vitriol and $\frac{1}{2}$ lb. of the best whiting in about 3 pts. water; stir it frequently while boiling, and also on taking it off the fire. When it has stood till quite cold, pour off the blue liquid, then mix the cake of color with good size, and use it with a plasterer's brush in the same manner as whitewash, either for walls or ceilings.

BROWN FREESTONE, To Imitate.—This paint is not made by mixing the ground stone nor any thing in it. First, make a pretty thick oil paint of the same color as the stone to be imitated, which may be done in different ways. The basis is white-lead or zinc white, colored with umber and Mars red, or any other pigments which suit you; put it on as usual, and while yet sticky throw common fine sand against it; this will not affect the color, and make a rough, sandy coat imitating the surface of the stone.

BRUSHES, Care of.—Brushes used for applying finishing varnishes should be cared for with the utmost pains, as good work depends much upon the good condition of the brushes. A good way to keep them is to suspend them by the handles in a covered can, keeping the points at least half an inch from the bottom, and apart from each other. The can should be filled with slow drying varnish up to a line about a sixteenth of an inch above the bristles or hair. The can should then be kept in a close cupboard, or in a box fitted for the purpose.

As wiping a brush on a sharp edge of tin will gradually split the bristles, cause them to curl backward, and eventually ruin the brush, the top of the can should have a wire soldered along the edge, or the edge of tin turned over, in order to prevent injury. Finishing brushes should not be cleansed in turpentine, except in extreme cases. When taken from the can prepare them for use by working them out in varnish, and before replacing them cleanse the handles and binding with turpentine.

CARMINE.—Take cochineal, 1 pound; carbonate of potash, $3\frac{1}{2}$ drachms; water, 7 gallons. Simmer for a little time, then remove the copper from the fire, and scatter powdered alum, 8 drachms, over the surface; let it stand fifteen minutes, until clear, then decant and put the solution into a clean copper, heat it, and add isinglass, $3\frac{1}{2}$ drachms, previously dissolved in 2 quarts of water and strained. Then bring it to a boil, and when a coagulum is formed, take it from the fire and stir it with a clean spatula; let it rest for twenty minutes, and the carmine will be found at the bottom of the liquid. Decant, and drain the carmine upon a piece of fine linen.

The remaining solution will make fine carminated lake.

CARMINE, GERMAN.—Take cochineal, 1 pound; water, 7 gallons. Boil for five minutes, then add alum, 1 ounce. Boil for five minutes more, filter and set aside the decoction in glass or porcelain vessels for three days, then decant the liquor and dry the carmine in the shade. The remaining liquor will still deposit color of an inferior quality, by standing.

CARMINE (Common) To Improve.—Take carmine, one part; water of ammonia to dissolve. Digest in the sun until the ammonia is saturated with the coloring part of the carmine, then precipitate the color with alcohol and acetic acid. Wash the precipitate carefully with alcohol and dry it.

CHESTNUT-COLOR, To make.—This color

is composed of red, yellow and black. The English red, or red ochre of Auvergne, ochre de rue and a little black, form a dark chestnut color. It is proper for painting of every kind. If English red, which is dryer than that of Auvergne, be employed, it will be proper, when the color is intended for varnish, to grind it with drying nut-oil. The ochre of Auvergne may be ground with the mastic gallipot, and mixed up with gallipot varnish.

The most experienced artists grind dark colors with linseed oil, when the situation will admit of its being used, because it is more drying. For articles without doors nut-oil is preferable. The colors of oak-wood, walnut-tree, chestnut, olive, and yellow, require the addition of a little litharge ground on porphyry: it hastens the desiccation of the color, and gives it body.

But if it is intended to cover these colors with varnish, as is generally done in wainscoting, they must be mixed up with essence, to which a little oil has been added. The color is then much better disposed to receive the varnish, under which it exhibits all the splendor it can derive from the reflection of the light.

COLORS, To Mix and Use.—Priming. Quite too little attention is paid to this department. The color is usually mixed up too thin and put on too heavy. The reverse is much the best. Let the priming be as thick as will spread easily, and then be well rubbed out under the brush. Litharge is the only drying necessary in priming. All work, inside or out, may be primed the same.—**Puttying.** After the priming; all work should have the nail-heads and cracks puttied up. It should be done with a putty-knife; puttying up with the fingers is a barbarous practice, and does not fill the holes well.—**Sand-Papering** and dusting should be done before the puttying; being done afterwards, is apt to dish out the puttied places.—**Second Coat—(Outside).** Mix with raw oil and use it as thick as it will spread easily. After the work is all covered, it should be cross-smoothed till it has an even surface, and then finished lengthwise, with long sweeps of the brush, pressing lightly.—**Third Coat.**—Made a little thinner than for the second coat, and rubbed out as much as possible, cross-smoothed, and finished with the tip of the brush very lightly, so as not to show the brush marks.—**Second Coat—(Inside).** Mixed as thick as it will work, with equal parts of raw oil and turpentine. Particular care should be taken to rub this out well, cross-smoothing and finishing with the tip of the brush; else the color will lie in ridges, which the next coat will not hide.—**Third Coat.** Mixed with three parts turpentine and one of raw oil, rubbed out thoroughly and smoothed carefully, so as to show no brush marks.—**Fourth Coat—Flattening.** Mixed with all turpentine thin enough so that it may be spread before it sets. Spread over quickly, without cross-smoothing; finish lengthwise with light sweeps of the tip of the brush; three or four strokes will be as much as one can do before it sets. Square up and finish each piece of work before beginning another.—**Drawn Flattening.** Mix up the ground lead with turpentine, nearly as thin as for flattening. Let it stand till the lead settles and the oil and turpentine rise to the top. Pour it off and mix again, and repeat the operation till that which rises to the top is clear turpentine. By this process the oil in which the lead is ground is entirely drawn

out, and the lead is mixed with turpentine. This color, however, is quite different from what it would be if the lead had been ground in turpentine. It is more tenacious, and flows better.

Much care must be taken to spread this on thickly and evenly. The room must be kept close, and free from any draught of air, as the color sets as fast as put on. This is used only as a fourth coat.—**Polish White.** This chaste and durable finish requires the zinc white to do it properly. It is made by mixing the zinc white with white varnish.—**Common Method.** After priming and second-coating in the usual way with lead, finish with the polish white.—**Best Method.** Put on two coats, as above, and then spread on several coats of yellow ochre, turpentine, and japan, with a little litharge. When dry, rub smooth and level with pumice stone. Then put on one coat of inside second coating, and flatten as usual; rub down with pumice stone, then a coat of polish white, and finish with a flowing coat of white varnish, in which is mixed some of the zinc white.—(Remarks.) When work is to be finished with a gloss, the previous coat should be a dead surface; when it is to be flattened, the previous coat should have a degree of gloss.

Lead is the white referred to in the above descriptions, yet the rules given for mixing may be applied to all other colors, except that the darker colors are generally finished with a gloss, inside or out. They require no turpentine only when they are to be varnished.

Oil dries with a glossy, turpentine, with a flat surface.

It is a wrong idea to put on heavy coats of paint; the more it is rubbed out, the better will the work look and wear. Each coat should stand two or three days before receiving another coat.

Color needs more drying in winter than in summer. Outside work lasts longer if painted in cold weather, as not so much of the liquid is evaporated, and a heavier body is thus dried upon the surface.

Litharge or japan is a good dryer for outside work, and for priming in the inside, or for dark colors; but sulphate of zinc is only fit for the last coats on the inside, though sugar of lead is used. Either of them may be dissolved in water, and stirred into the color.

Transparent colors will work more freely, and spread on with an even flow, by being mixed with raw oil and japan, with a little water stirred in.

In mixing thick colors, the liquid should be added gradually, else the lumps will not be thoroughly broken.

COPAL, To Dissolve in Alcohol.—Copal, which is called gum copal, but which is not, strictly, either a gum or a resin, is the hardest and least changeable of all substances adapted to form varnishes, by their dissolution in spirit, or essential, or fat oils. It, therefore forms the most valuable varnishes; though we shall give several receipts where it is not employed, which form cheaper varnishes, sufficiently good for many purposes, adding only the general rule, that no varnish must be expected to be harder than the substance from which it is made.

To dissolve copal in alcohol, dissolve half an ounce of camphor in a pint of alcohol; put it into a circulating glass, and add four ounces of copal in small pieces; set it in a sand-heat, so regulated

that the bubbles may be counted as they rise from the bottom, and continue the same heat till the solution is completed.

The process above mentioned will dissolve more copal than the menstrum will retain when cold. The most economical method will therefore be, to set the vessel which contains the solution by for a few days, and, when it is perfectly settled, pour off the clear varnish, and leave the residue for future operation.

The solution of copal thus obtained is very bright. It is an excellent varnish for pictures, and would, doubtless, be an improvement in japanning, where the stoves used for drying the varnished articles would drive off the camphor, and leave the copal clear and colorless in the work.

COPAL, To Dissolve in Spirits of Turpentine. Reduce two ounces of copal to small pieces, and put them into a proper vessel. Mix a pint of the best spirits of turpentine with one-eighth of spirits of sal ammoniac; shake them well together, put them to the copal, cork the glass, and tie it over with a string or wire, making a small hole through the cork. Set the glass in a sand-heat so regulated as to make the contents boil as quickly as possible, but so gently that the bubbles may be counted as they rise from the bottom. The same heat must be kept up exactly till the solution is complete.

It requires the most accurate attention to succeed in this operation. After the spirits are mixed, they should be put to the copal, and the necessary degree of heat be given as soon as possible, and maintained with the utmost regularity. If the heat abates, or the spirits boil quicker than is directed, the solution will immediately stop, and it will afterwards be in vain to proceed with the same materials: but if properly managed, the spirit of sal ammoniac will be seen gradually to descend from the mixture, and attack the copal, which swells and dissolves, excepting a very small quantity which remains undissolved.

It is of much consequence that the vessel should not be opened till some time after it has been perfectly cold; for if it contain the least warmth when opened, the whole contents will be blown out of the vessel.

Whatever quantity is to be dissolved should be put into a glass vessel capable at least of containing four times as much, and it should be high in proportion to the width.

This varnish is of a deep rich color, when viewed in the bottle, but seems to give no color to the picture upon which it is laid. If it be left in the damp, it remains racky, as it is called, a long time; but if kept in a warm room, or placed in the sun, it dries as well as any other turpentine varnish, and when dry it appears to be as durable as any other solution of copal.

Copal may also be dissolved in spirits of turpentine by the assistance of camphor.

Turpentine varnishes dry more slowly than those made with alcohol, and are less hard; but they are not so liable to crack.

COPAL-LACKER, Improved Process for the Preparation of.—Copal-lacker is generally prepared by carefully melting copal, adding linseed oil varnish, and afterwards oil of turpentine. By Hoedfield's process (patented in France) twice the amount of oil of turpentine that generally is taken is used to procure a more complete solution of the copal, and to obtain the lacker clearer and

more colorless. Air is then passed into the mixture for some time, when the oxygen under the influence of the oil of turpentine becomes ozonized, and acting upon the oil hastens its drying. As soon as the oxidation is thought sufficient, half of the oil of turpentine is distilled off; the remaining lacker contains therefore not more of the oil than ordinarily prepared lacker, but it dries quicker and is more colorless. The distilled oil of turpentine is greatly superior for the preparation of fresh portions of the lacker, on account of the azote it still contains, and is used solely for this purpose.

DRYER, JAPAN.—1. Take linseed oil, 1 gallon; put into it gum shellac, $\frac{3}{4}$ lb.; litharge and burned Turkey umber, each $\frac{1}{2}$ lb.; red lead, $\frac{1}{2}$ lb.; sugar of lead, 6 oz. Boil in the oil till all are dissolved, which will require about four hours; remove from the fire, and stir in spirits turpentine, 1 gallon, and it is done.—2. Linseed oil, 5 gallons; add red lead and litharge, each $3\frac{1}{2}$ lbs.; raw umber, $1\frac{1}{4}$ lbs.; sugar of lead and sulphate of zinc, each $\frac{1}{2}$ lb.; pulverize all the articles together, and boil in the oil dissolved; when a little cool, thin with turpentine, 5 gallons.

DRYER, for Painting.—Vitreous oxide of lead (litharge), is of no other use in painting than to free oils from their greasy particles, for the purpose of communicating to them a drying quality. Red litharge, however, ought to be preferred to the greenish yellow; it is not so hard, and answers better for the purpose to which it is destined.

When painters wish to obtain a common color of the ochrey kind, and have no boiled oil by them, they may paint with linseed oil, not freed from its greasy particles, by mixing with the color about 2 or 3 parts of litharge, ground on a piece of porphyry with water, dried, and reduced to fine powder, for 16 parts of oil. The color has a great deal of body, and dries as speedily as if mixed with drying oil.

DRYING OIL, (Colorless).—Boil linseed oil for two hours with three per cent. of red lead, filter it, and then expose it to sunlight in large shallow vessels, frequently renewing the air above.

DRYING OIL for ZINC PAINT.—In order to avoid the use of oxide of lead in making drying oil for zinc paint, oxide of manganese has been proposed as a substitute. The process to be adopted is as follows:

The manganese is broken into pieces about the size of peas, dried, and the powder separated by means of a sieve. The fragments are then to be introduced into a bag made of iron-wire gauze. This is hung in the oil contained in an iron or copper vessel, and the whole heated gently for 24 or 36 hours. The oil must not be allowed to boil, in which case there is great danger of its running over. When the oil has acquired a reddish color, it is to be poured into an appropriate vessel to clear.

For 100 parts of oil 10 of oxide of manganese may be employed, which will serve for several operations when freshly broken and the dust separated. Experience has shown, that when fresh oxide of manganese is used it is better to introduce it into the oil upon the second day. The process likewise occupies a longer time with the fresh oxide. Very great care is requisite in this operation to prevent accident, and one of the

principal points to be observed is that the oil is not overheated. If the boiling should render the oil too thick, this may be remedied by an addition of turpentine after it has thoroughly cooled.

DRYING (Quick) PAINT.—Twelve parts of shellac and four parts of borax are added to one hundred parts of water; heat is carefully applied, while the mixture is continually stirred, and soon a complete solution is obtained which is colorless or brown according to the color of the shellac employed. This solution, as we have said, forms a varnish perfectly impermeable to water, and not acted on by the atmosphere. It can be used with oil paints, to make them dry quickly, by adding an equal part of the varnish with a little turpentine to the oil color, and rubbing them together until a homogeneous fluid mixture is obtained. This mixture dries in from ten to fifteen minutes, and hence only a small quantity must be prepared at a time.

DARK WOODS, To Imitate.—The appearance of walnut may be given to white woods, by painting or sponging them with a concentrated warm solution of permanganate of potassa. The effect is different on different kinds of timber, some becoming stained very rapidly, others requiring more time for this result. The permanganate is decomposed by the woody fibre; brown peroxid of manganese is precipitated, which is afterward removed by washing with water. The wood, when dry, may be varnished, and will be found to resemble very closely the natural dark woods.

FRESCO PAINTING.—The ground upon which fresco is painted is a lime ground; and, in order to have a permanent picture, we must have a firm and stable ground. First of all, the wall must be absolutely dry; there must be no leakage of moisture from behind. Lime which has been run (as it is, I believe, technically called by builders) for a year or a year and a half, is best to be employed, for in proportion as the lime has been carbonated (though it must not be so to too great an extent) by the action of the carbonic acid of the air, it makes a better and a harder mortar. With this lime must be mixed river sand, of even grain; the sand should be mixed with water, and allowed to pass along down a small stream, so that in the centre of the stream you would have sand the grains of which would be pretty nearly equal in size. This is a point of considerable importance. The reason why new lime cannot and ought not to be used is because it blisters; small blisters appear on the surface, and that of course would be ruinous to a picture. A well plastered wall should not have a blister or a crack in it, and this is secured by having your lime run for some time, of good quality to start with, and mixed with good sand. There is no chemical process that I know of that takes place in fresco painting other than this, that silicates are formed by the action of the lime upon the sand, and carbonates by the action of the carbonic acid of the air upon the lime.

In painting a fresco picture, inasmuch as there is no retouching the work when it is finished, the artist must make his drawing very carefully. The cartoon is made upon ordinary paper; then it is fixed against the wall, where the picture is to be painted. The part where the artist decides to begin his work is uncovered; that is to say, a portion of the paper is turned down and cut away,

but in such a manner that it may be replaced. Then the plasterer puts fresh plaster, about an eighth of an inch thick, upon the uncovered portion of the wall; and the plasterer's work is of the utmost importance in fresco painting. The workman ought to practice it well before he attempts to prepare the ground for a large picture, and I have found it of the greatest importance to allow the man to practice for several weeks before he was allowed to prepare any portion of the ground, even for decorative painting. In this way he becomes accustomed to the suction of the wall, and upon the suction of the wall depends the soundness of the ground and the success of fresco painting. When the plaster is first put on, of course it is very soft; the piece of the cartoon is replaced upon it, and the lines of the picture are gone over with a bone point so that an indentation is made, and then the artist begins his painting. At first he finds his colors work greasy; you cannot get the tint to lie on, it works streaky; but you must not mind that, you must paint on, but you must only paint on for a certain time, for if you go on painting too long, you will interfere with the satisfactory suction of the ground, which is so necessary to produce a good fresco painting. Of course, nothing but practice can tell any one the period at which he ought to stop. I cannot describe it, because I should be simply trying to describe a sensation, which I cannot do. After some practice, you know perfectly well by the feel when you ought to stop. If you feel your color flowing from your brush too readily, you ought to stop at this period. You must then leave your work for a time, and go back to it again. And then you will find, as the plaster sucks in the color which you have first laid on, that there will be,—it may be in the course of half an hour, it may be an hour; that depends upon the temperature of the atmosphere,—a pleasant suction from your brush, the color going from it agreeably, and you will find that it will cover better. Now is the time to paint rapidly, and complete the work you have in hand. When the color leaves your brush as though the wall were thirsty for moisture, you should cease painting; every touch that is applied after that will turn out gray when it dries, and the color will not be fast upon the wall.

FIRE-PROOF PAINT, for Roofs, etc.—Slack stone lime by putting it into a tub, to be covered, to keep in the steam. When slacked, pass the powder through a fine sieve; and to each 6 qts. of it add, 1 qt. of rock-salt, and water 1 gal.; then boil and skim clean. To each 5 gals. of this add, pulverized alum 1 lb. pulverized copperas $\frac{1}{2}$ lb.; and still slowly add powdered potash $\frac{3}{4}$ lb.; then fine sand or hickory ashes 4 lbs. Now add any desired color, and apply with a brush—looks better than paint, and is as durable as slate. It stops small leaks in roofs, prevents moss, and makes it incombustible and renders brick impervious to wet.

FROSTING GLASS.—1. Take sugar of lead well ground in oil, applied as other paint; then pounced, while fresh, with a wad of batting held between the thumb and finger. After which it is allowed to partially dry; then with a straight-edge laid upon the sash, you run along by the side of it, a stick sharpened to the width of line you wish to appear in the diamonds, figures, or squares, into which you choose to lay it off; most frequently, however, straight lines are made

an inch or more from the sash, according to the size of light, then the centre of the light made into diamonds.—2. A common preparation for frosting glass to prevent the too direct action of the solar heat in green-houses, etc., is a wash of whiting and glue-water. It must not contain too much glue, as it is desired to wash it off late in the season by the action of rain, to compensate for the decrease in temperature.

FURNITURE CREAM.—Beeswax, 1 lb.; soap, 4 oz.; pearlash, 2 oz.; soft water, 1 gal.; boil together until mixed.

FURNITURE OIL.—1. Acetic acid, 2 drs.; oil of lavender, $\frac{1}{2}$ dr.; rectified spirit, 1 dr.; linseed-oil, 4 oz.—2. Linseed-oil, 1 pt.; alkanet-root, 2 oz.; heat, strain, and add lac varnish, 1 oz.—3. Linseed-oil, 1 pt.; rectified spirit, 2 oz.; butter of antimony, 4 oz.

FURNITURE PASTE.—1. Turpentine, 1 pt.; alkanet-root, $\frac{1}{2}$ oz.; digest until sufficiently colored, then add beeswax, scraped small, 4 oz.; put the vessel into hot water, and stir till dissolved. If wanted pale, the alkanet-root should be omitted.—2. (White.) White wax, 1 lb.; liquor of potassa, $\frac{1}{2}$ gal.; boil to a proper consistence.—3. Beeswax, 1 lb.; soap, $\frac{1}{2}$ lb.; pearlash, 3 oz. (dissolved in water, $\frac{1}{2}$ gal., and strained); boil as last.—4. Yellow wax, 16 parts; resin, 1 part; alkanet-root, 1 part; turpentine, 6 parts; linseed-oil, 6 parts. First steep the alkanet in the oil with heat, and, when well colored, pour off the clear on the other ingredients, and again heat till all are dissolved.

GILDING, Mixture for, and How to Use it.—Gold size may be used as a laying coat. However, the mixture of the house-gilders is preferable, and consists of an addition of white lead and chrome yellow, ground very fine with linseed oil.

This mixture must be used quite dry, that is to say, often stirred, and the brush or pencil pressed against the sides of the cup to remove all excess. A good mixture may receive the gold twelve hours after it has been laid down, and the same process answers for bronzing. When the gilder has delivered his work to the painter, the latter must wash it with plenty of water, taking care not to scratch the gold. It is better to wait three or four days before washing. The gold stripping receives a first fixing with gelatine dissolved in water and a second with white varnish diluted with turpentine. When all is dry, the portions of gold which may have stuck against the paint of the groundwork are covered with the same color; or, if we desire to avoid this extra work, we rub the body and gears with a sponge dipped into water containing finely levigated clay.

GILDING LIQUID.—Take of fine gold five ounces (troy); nitra-muriatic acid, fifty-two ounces; dissolve by heat, and continue the heat until red or yellow vapors are evolved; decant the clean liquid into a proper vessel; add of distilled water, four gallons; pure bicarbonate of potash, 20 lbs.; boil for two hours.

GILDING, Out Doors.—Take unruléd writing paper, and wax it. First put on the size, and then take the book of leaf, and laying it on any convenient surface, slip the waxed paper into the gold leaf, pressing it down with the hand so as to bring the waxed surface in contact with all parts of the leaf, then withdraw the paper and the leaf will adhere to it. In this way a hurricane may be defied.

GILDING, To Improve.—Mix a gill of water with two ounces of purified niter, one ounce of alum, one ounce of common salt; lay this over gilt articles with a brush, and the color will be much improved.

GILDING, Burnished.—Coat the wood first with size, and afterwards with size and whiting mixed until a sufficient thickness is obtained. Between each coat, glass paper must be used to smooth the surface. The gold size is now applied thinly, and when nearly dry the leaf is attached, and afterwards burnished.

GILDING on Glass.—1. Mix powdered gold with thick gumarabic and powdered borax. With this trace the design on the glass, and then bake it in a hot oven. Thus the gum is burnt and the borax is vitrified, at the same time the gold is fixed on the glass. To make powdered gold: Rub down gold leaf with pure honey on a marble slab, wash the mixture, and the "precipitate" is the gold used.—2. Dissolve in boiled linseed oil an equal weight either of copal or amber, and add as much oil of turpentine as will enable you to apply the compound or size thus formed as thin as possible to the parts of glass intended to be gilt. The glass is to be placed in a stove, till so warm as almost to burn the fingers when handled. At this temperature the size becomes adhesive, and a piece of leaf gold, applied in the usual way, will immediately stick. Sweep off the superfluous portions of the leaf, and when quite cold it may be burnished. Take care to interpose a piece of Indian paper between the gold and burnisher.

GILDERS GLUE.—A very superior article of the so called gilders' glue is obtained by cutting rabbit-skins into fine shreds, and boiling in water, then turning the mixture into a basket, through which the liquid passes, leaving the refuse behind. About fifteen hundred grains of sulphate of zinc and three hundred and seventy-five of alum are then to be separately dissolved in pure boiling water, and poured into the first-mentioned liquid, and the whole well stirred together while hot. The mixture is then to be passed through a sieve into a rectangular box, in which the jelly remains twenty-four hours in winter, or about forty-eight in summer. The mass now having become solid, is to be separated from the box, and cut into slices of proper thickness, and laid upon nets to dry, either in the open air or by means of some kind of artificial heat.

GILDING, Sizing for.—The best sizing for gilding on glass is made as follows: Put a piece of isinglass as large as an old fashioned cent into a teacup; fill half full with boiling water. When well mixed, and before cold, fill nearly full with spirits of wine.

GLAZING.—Sashes are primed before glazing. Glass laid in with the crown or convex side out. The tins driven in with a chisel or glazing hammer; four tins to each glass on the two long sides, about one fourth of the distance from the corners. If tins are put in the center, they are apt to break the glass, especially in cold weather.—**Back Puttying.** In good work and medium-sized glass, after the glazing is done and the putty well set, fill the spaces on the inside. Use the putty soft, or it will press the glass out.—**Bedding,** for superior work and large glass, is the best. Glaze the rabbit with soft putty, and press the glass down into it as close as it will

lay, pressing on the edges and not the middle of the glass, then glaze as usual. Where the moulding of the sash is to go outside, the crown side of the glass should be out also.—*Cleaning* after the glazing is done, with water and a brush, or with whitening and a dry brush. The line of the putty should come just even with the line of the moulding on the other side of the glass.

GOLD LEAF, To Prevent the Adhesion of.—Painters and decorators will find the following plan a good one to simplify a most troublesome part of their work: A small piece of ball liquorice, dissolved in water, applied with a flat camel's hair brush to the place intended to be left unglazed, will prevent the leaf adhering. The solution must be weak. Made thick and gummy, it is very useful to protect ornamental parts of work that is to be re-painted.

GRAINING.—In order to obtain any degree of perfection in the imitations of woods and marbles, it is necessary to procure panels or bits of veneer, and copy the color and form of the grains as near as possible.—*Graining in Oil.* Mix the grain color in boiled oil and turpentine, and add a little soap, or whitening, or even both: it makes it flow better. Clean the sponge, etc., in oil or turpentine.—*For Distemper,* the grain color is ground in ale, beer, vinegar, or whiskey; the object being to bind the color so that it will not rub off. As a general thing, stale ale or beer is the best. Whiskey, however, in cold weather, might be preferred, because it does not creep like other fluids; but if the ground-work is rubbed over with whiskey it will be sufficient. Graining should be done with a free and careless motion of the hand, yet having an eye to the character of the wood.—*Distemper Graining* requires the ground-work to be dampened by rubbing all over with a sponge wrung out of the ale, previous to putting on the grain color. The ground-work: as in other mixtures, take the body color first, and add the positive colors by degrees, till the required tint is produced. The work may be primed, as for other work, with any light color. The second coat must approach to the ground-color, and the third coat must be the tint to grain upon, and is best mixed with a gloss, either for inside or out. Less than three coats of ground color will not make a good job. In particularizing the specific quantities of proportion of ingredients, we are governed only by general principles. The artist must regulate the tint according to taste. The brush, cloth, or sponge, or whatever tools may be used, must be frequently washed out in water while doing a job.—*Glazing* colors are transparent, and are mixed very thin, whether the vehicle is oil or water.—*Blending* must be done by brushing the tip of the blender back and forth lightly over the work while it is wet.—*Blazing* is done by sliding the blaze stick up, and bearing round to the right or left. The same motion is required in packing in the fine check grain with the side of the blender; striking with the flat side of the blender, pushing the hand upward.

GRAINING, Black Walnut.—*Tools.* Same as for mahogany.—*Ground.* Drab, made of lead, yellow ochre, venetian red, and black.—*Grain Color.* Burnt umber. The grain is made almost the same as for mahogany, only that the blaze stick is used more freely; and by specimens of the real wood, it will be seen that the blazes run nearly the whole length of the branch, and

more regular than mahogany, running gradually from bottom to top.

GRAINING, Mahogany.—*Tools.* A sponge, or cloth, or a piece of buckskin for wiping out the lights. A common paint brush, to put on the color. A blaze stick, to make the bright blazes in the center of the branch. It is made of a piece of wood shaved down thin, or a paper card, three inches long and one inch wide, and very thin. A blender, to soften the work. A top grainer, to put in the dark grain.—*Ground.* Chrome yellow and orange red lead. About one third lead, but sufficient to tint to a bright orange.—*Grain Color.* Burnt terra de sienna. Dampen the work with the fluid you grain with. Spread on the grain color with a brush; blend crosswise. Wipe out, with a sponge or cloth, the light parts. Blend again till soft. Put in the blazes up through the center with the blaze stick. Blend down the crude roughness of this lengthwise. When dry, rub off with the hand or a soft cloth, the rough particles. Give a coat of thin varnish.—*For Glazing.* Add a small quantity of asphaltum to the grain color, so that it is a shade darker than before, and add ale till it is quite thin. Rub it well out over the whole surface. Blend it crosswise. Peck it all over with the side of the blender, pushing the hand upward to produce the fine check grain. When dry, put on the dark top grain. Another method is, instead of making the check grain, to wipe the blender through the glazing, making the top grain in that way. Dark or light mahogany is made by using corresponding colors in the ground, grain, and glazing. When the graining does not tint, it may all be rubbed off with the wet sponge, and grained over again.

GRAINING, Maple.—*Tools.* Brush, to put on color. Buckskin, to wipe out lights. Blender and top grainer.—*Ground.* Cream color, made with white lead and yellow ochre.—*Grain Color.* Raw sienna and raw umber, equal parts in all. Coat the work. Fold the buckskin, and with the edge wipe out the lights which make the curl. Blend lengthwise of the curl. Varnish with thin varnish, and when dry, glaze over the whole with the grain color made very thin, and to which is added a very little asphaltum. Wipe out, with the sponge, large patches of lights, and blend crossings. When dry, top grain with the glaze color.—*Bird's-eye* is managed the same way, except that, after the grain color is laid on, patches of light are wiped out with a wet sponge. Blend, and then dot over the whole, in patches, by sticking the ends of the fingers over it. Then blend very lightly.

GRAINING, Oak.—The most important and best system of graining oak is the oil-color process. It must be understood that oak has two distinct characteristics. The first is the grain of the wood, which is formed by the pores, and which always runs the length way of the plank, and, in fact, of the tree also, and this is fine or coarse, as the case may be; the other is technically called "the figure"—the dapple, the veining, and the lights of the oak. These markings, almost in every case, run across the grain, and, as a rule, have a silvery reflection, and stand out lighter and brighter than the grain, and sometimes they have a light silvery edge and a dark center. Of course, both the grain and the markings are different in different descriptions of oak. In the English oak the grain and the veining, or

figure, are much finer and closer than in the foreign oak. The Dantzic oak, for instance, is exceedingly coarse or open in its grain or pores, and the "lights," or figure, as a rule in broad or thick lumps, without much grace or beauty of form; while the figure in English oak is arranged or flows in graduated curves, having a beauty peculiarly its own. The grain and the markings require different methods of working, and there is no method yet invented which does this so effectively and so well as the oil process.

New work should be well dusted before being primed. After the first coat is dry, it should be rubbed down with sandpaper and stopped with good sound putty. Three coats should then be put on and the work sandpapered between each coat; except this be done, no good work can result. The finishing coat should be mixed with three parts of oil to one of turps. The color for light or new oak, commonly called wainscot, should be a light creamy buff, made with Oxford ochre and white, and a little vermilion or Venetian red. Some grainers like a white ground for this very light oak, but it has a rawness of look which is not at all pleasant to look upon.

For a middle shade of oak the color should be stained with Oxford ochre, Venetian red, and a little burnt umber; and for dark oak, with burnt umber, Venetian red, and a little orange chrome. These may all be modified by admixture with black, in a degree according to whether the oak when finished is to be warm or cool in tone. And here we may note that the color of the ground is of vital importance to the effect of the work when finished. Many persons don't care much about the ground color so that it is light enough, as they depend upon the glazing color to bring it up to the required shade. This we are quite certain is a mistake, for if two panels be grained, one on a white or nearly white ground, and the other on a rich colored ground, the former cannot by any amount of glazing be brought to the same richness of the color as the latter; therefore it is the wisest plan to work upon ground colors which are of the same tone of color, or nearly so, as the work is intended to be finished. The contrast also between the graining color and the ground color should never be violent. When it is so, the work has a staring vulgarity about it very undesirable. The "figure" or markings stand out so prominently and so positively that all fitness and repose is destroyed. This is a very common fault with grainers, and one which should be avoided. Grainers of this class are very fond of bright chrome-yellow ground, and of glazing their work with burnt sienna, thus making it "foxy," and, as a matter of course, ugly and vulgar.

GRAINING, Rose-Wood.—*Tools.* A flat brush, sponge, blender, camel's hair pencil, and fitches.—*Ground.* Drop black. Spread on the color, and wipe out with the sponge or flat brush. The grains are put in with the top grainer and pencils. Glaze with rose-pink and asphaltum mixed, and wipe out any knots or shadows to suit the fancy.

GREENS.—All mineral greens have their bases in copper, and some of them contain arsenic.—*Brunswick or Bremen Green* is a compound of carbonate of copper and chalk, and the best has a portion of lead. This is a fine, lasting green, and is much more neglected than it should be. It is less poisonous than most greens, as

it contains little or no arsenic. When used alone, it is of too blue a cast, but being lightened up with light chrome, or lemon chrome yellow, it makes a green almost equal to emerald, both in brilliancy and durability, and has a softer pleasanter tone. An equal quantity of emerald mixed with it increases its brilliancy.—*Scheele's Green* is composed of acetate of copper and arseniate of potash. It is very poisonous, without being redeemed by beauty or durability.—*Emerald Green.* This intensely brilliant color is a compound of yellow arsenic and verdigris, and consequently the most deadly poison with which painters have to deal. Some years ago, when verdigris was in vogue, painters complained of the deleterious effect of that miserable color; but they may now well find fault when they are obliged to stand the ravages of the combined force of that and arsenic also. It was first discovered and manufactured in France, and has only been in use a few years, and it is to be hoped that its future existence will be as brief at its past; for its effects upon the people who have their rooms painted, washed, and papered with it are almost as bad as upon the painter who uses it.—*Chrome Green* was formerly made from the blue oxide of chromium, but that which is now mostly in use is a compound of potash, sulphur, and chromic acid. Some factories, however, are now preparing it from the chemical Prussian blue and chrome yellow. This is a very soft, rich, and durable color, but in the rage for the glaring emerald; it has been much overlooked.

GREEN PAINT.—Every green color, simple or compound, when mixed up with a white ground, becomes soft, and gives a sea-green of greater or less strength, and more or less delicate, in the ration of the respective quantities of the principal colors. Thus, green oxides of copper, such as chrome green, verdigris, dry crystallized acetate of copper, green composed with blue verditer, and the Dutch pink of Troyes, or any other yellow, will form, with a base of a white color, a sea-green, the intensity of which may be easily changed or modified. The white ground for painting in distemper is generally composed of Bougival white (white marl), or white of Troyes (chalk), or Spanish white (pure clay); but for varnish or oil painting, it is sought for in a metallic oxide. In this case, ceruse or pure white oxide of lead is employed.

GREEN, SCHEEL'S.—Carbonate of potash, 32 parts; water, 325 parts. Dissolve, then add arsenious acid, 11 parts. Next, sulphate of copper, 32 parts; water, 480 parts. Dissolve and filter each solution separately, then add the first to the second, until it ceases to produce a rich grass-green precipitate; collect and wash the green powder in clean water.

GREEN, CHROME.—Take Paris-white, 6½ lbs.; sugar of lead, and blue vitriol, of each 3½ lbs.; alum, 10½ ozs.; best soft Prussian blue and chrome yellow, of each 3½ lbs. Mix thoroughly while in fine powder, and add water, 1 gal., stirring well and let stand 3 or 4 hours.

GREEN, PARIS.—Take unslacked lime of the best quality slack it with hot water; then take the finest part of the powder and add alum water, as strong as can be made, sufficient to form a thick paste, then color it with bi-chromate of potash and sulphate of copper until the color suits your fancy, N. B.—The sulphate of copper gives the color a blue tinge—the bi-chromate of

potash a yellow. Observe this and you will never fail.

GREEN for WALLS.—Take 4 lbs. Roman vitriol, and pour on it a tea-kettle full of boiling water. When dissolved, add 2 lbs. pearlash, and stir the mixture well with a stick until the effervescence ceases; then add $\frac{1}{4}$ lb. pulverized yellow arsenic, and stir the whole together. Lay it on with a paint-brush; and, if the wall has not been painted before, two, or even three, coats will be requisite. If a pea-green is required, put in less, if an apple-green, more of the yellow arsenic. This paint does not cost the quarter of oil-paint, and looks better.

ISINGLASS SIZE.—This may also be prepared in the manner above directed for the glue, by increasing the proportion of the water for dissolving it, and the same holds good of parchment size. A better sort of the common size may be likewise made by treating cuttings of glovers' leather in the same manner.

KALSOMING.—The rough unfinished appearance of a white or yellow washed wall is not its most disagreeable peculiarity. It perpetually gives off its dirt, and its own fabric in powder, to any one who brushes it with his garments, or who hangs his clothes against it. The superior smoothness and glaze of a good kalsomined wall is a great improvement to the style of the interior of a house; and if well made, such a surface is suitable to the best rooms of a good house, and is so cheap as to be within the means of the poorest. It requires care and judgment in the selection of the not expensive materials, and above all, capability and skill in applying it to the wall.

The plaster is made of Paris white, a fine powder produced by the pulverization and elutriation of common chalk, mixed with fine, clear white glue, dissolved in water. The Paris white costs about three cents a pound, but the wandering operatives who apply for jobs ask a much higher price for it.

The process should be commenced by soaking four ounces of glue in a quart of warm water for twenty or twenty-four hours; then a pint of water should be added; and the vessel (of tin or other thin metal) should be placed in a kettle of hot water over a fire, the glue being agitated till it is thoroughly dissolved and the solution quite clear. Put five or six pounds of powdered Paris white into a large bucket, and add hot water sufficient for the mixture to be of the consistency of cream. Then mix the glue water with it, stir it well, and paint the walls with the mixture with the usual whitewash brush.

It is of the utmost importance that the kalsomining mixture be spread very smoothly, and to secure this, a little hot water must be added, if the stuff be too thick for easy and level application. The quantities given above are sufficient for two coats on a large room, say one eighteen feet square; and for good work two coats should always be applied. A little care in manipulation will produce by kalsomining a neat and handsome effect, even in the hands of the most inexperienced operator.

KILLING GREASE.—Old work is always more or less greasy and smoky. Wash over the smoky or greasy parts with nitre, or with very thin lime whitewash. Soda will do, but lime is the best and cheapest.

KILLING KNOTS.—Glue size and red

lead. Gum shellac dissolved in alcohol, and mixed with red lead. Gutta percha dissolved in ether. But through all or any of these will the pitch of the knot exude if exposed to the sun. Perhaps the very best method is, to size the knot with oil size, and then lay a leaf of gold or silver on it. In a very choice piece of work, a hot iron may be held over the knot till a good portion of the pitch has come out and been scraped off, when the two coats of the leaf will be sure to keep out both the pitch and any discoloration.

LACQUERS.—1. *Deep Golden Lacquer.*—Seed-lac, 3 ozs.; turmeric, 1 oz.; dragon's-blood, $\frac{1}{4}$ oz.; alcohol, 1 pint. Digest for a week, shaking frequently; then decant and filter. — 2. *Golden Lacquer.*—Turmeric, 1 lb.; gamboge, $1\frac{1}{2}$ ozs.; gum sandarac, $3\frac{1}{2}$ lbs.; shellac, $\frac{3}{4}$ lb., (all in powder;) rectified alcohol, 2 gallons. Dissolve, strain, and add 1 pint of turpentine varnish. — 3. *Red Lacquer.*—Spanish annatto, 3 lbs.; dragon's-blood, 1 lb.; gum sandarac, $3\frac{1}{4}$ lbs.; rectified alcohol, 2 gallons; turpentine varnish, 1 quart. Dissolve and mix, as in No. 2. — 4. *Pale Brazen Lacquer.*—Gamboge, (cut small,) 1 oz.; cape aloes, (do.,) 3 ozs.; pale shellac, 1 lb.; rectified alcohol, 2 gallons. Dissolve and mix, as in No. 2. — 5. *Another Brazen Lacquer.*—Seed-lac, dragon's-blood, annatto, and gamboge, each, 4 ozs.; saffron, 1 oz.; rectified alcohol, 10 pints. Dissolve, etc., as in No. 2.

As these lacquers are often wanted of different shades of color, it is well to keep on hand a concentrated solution of each coloring ingredient, so that it may be added at any time to produce the desired tint.

LACQUER, COLORLESS.—Dissolve $2\frac{1}{2}$ ounces of shellac in 1 pint of rectified spirits of wine; boil for a few minutes with 5 ounces of well-burned and recently heated animal charcoal. A small portion of the solution should then be filtered, and if not colorless, more charcoal must be added. When all color is removed, press the liquid through a piece of silk, and afterward filter through fine blotting paper.

LAMPBLACK, To make.—Suspend over a lamp a funnel of tin plate, having above it a pipe to convey from the apartment the smoke which escapes from the lamp. Large mushrooms, of a very black, carbonaceous matter, and exceedingly light, will be formed at the summit of the cone. This carbonaceous part is carried to such a state of division as cannot be given to any other matter, by grinding it on a piece of porphyry.

This black goes a great way in every kind of painting. It may be rendered drier by calcination in close vessels.

The funnel ought to be united to the pipe, which conveys off the smoke, by means of wire, because solder would be melted by the flame of the lamp.

LIME WATER.—Equal parts of lime water and linseed oil, which will mix if well shaken, when united with any body matter, particularly lead, form a solid and almost imperishable cement, which, for priming and second coating, or even the last coat, is far superior to oil paint; and the painter who supposed he was cheating his employer, was actually benefiting him. The color, however, works badly, as it is thick, light, and creamy, and harder to spread; and if fifty per cent. is saved in the oil, thirty per cent. is lost in time, and ten per cent. in the extra quan-

tity used; so, after all, there is not much saved in its use.

LINSEED OIL, To bleach.—To bleach linseed oil expose the oil to the rays of the sun in glass bottles, and it very soon becomes white and clear, with a deposit of the impure matters at the bottom. Some persons filter the oil through animal charcoal. Another good method is to heat the oil in a wooden vessel by means of a steam pipe, having first added to each gallon about one pound of "filtering powder", made by drying pure clay of fuller's earth by a gentle heat, and grinding it to powder. The oil must then be filtered through bags made of Canton flannel or felt. Bags are now made from the latter material for this purpose, without seam, by the same process as that employed for hat bodies.

MADDER LAKE.—Ground madder, 1 pound; water, 8 pounds. Boil for fifteen minutes, then add alum, 2 ounces. Dissolve and strain, then precipitate the color, with a strained solution of pearlash, added gradually; lastly, collect and well wash the powder. The lake thrown down on the first addition of the potash is of the finest quality, and each successive portion decreases in value.

MAHOGANY, To Imitate.—The surface of any close grained wood is planed smooth, and then rubbed with a solution of nitrous acid. Next apply with a soft brush a mixture of one ounce of dragon's blood dissolved in a pint of alcohol and with the addition of a third of an ounce of carbonate of soda. When the polish diminishes in brilliancy, it may be restored by the use of a little cold drawn linseed oil.

MAHOGANY COLOR for Wood.—Logwood, two ounces, is boiled down half with a pint of water, then strained, and the filtrate mixed with half an ounce of chloride of barium. Most woods employed for furniture may be stained a close imitation of mahogany, varying in depth with the length of immersion. An oak color results when the bath is diluted with rain water.

MARBLES, To Imitate.—Paint the ground-work, and when dry and rubbed down, dampen the whole surface with boiled oil, rubbed on with a cloth. For the light marbles, however, some prefer to work the grain in the ground color while wet.

MARBLES, Gray and White.—This is very simple, though it requires some skill to do it nicely. Paint with white or lead color, and vein and mottle with black and slate color, in the wet paint, and blend it all down softly with a paint brush.

MARBLE, Italian.—Tools. Camel's hair pencils, blender, and sponge.—*Ground.* Black.—*Grain Color.* Gold tint, for bright veins. Burnt sienna, white and yellow ochre, fluid, oil, and turpentine.

Scramble out, in patches, with thin white lead, with a sponge; blend; then, with the hair pencil, trace in the larger dark veins with burnt sienna, then with yellow ochre, and lastly with the gold tint, running the lines over each other, yet all having the same general direction. It will be seen, from the specimens, that these veins are series of irregular loopholes and patches of light, crossed and connected by sharp, crinkled, and angular lines, the whiter lines being the sharpest.

When veined and dry, glaze with very thin asphaltum, in patches, to give it depth. Then varnish, and, if desired, polish.

OIL, DRYING.—A good drying linseed oil, prepared without the usual process of boiling. Mix with old linseed oil, the older you can get it the better, 2 per cent. of its weight of manganese borate (this salt is readily prepared by precipitating a solution of sulphate of manganese with a solution of borax, wash the precipitate, and dry it either at the ordinary temperature of the air or at 100°), and heat this mixture on a water-bath, or, if you have to work with large quantities, with a steam-bath to 100°, or at most 110°; you thus obtain a very excellent, light-colored, rapidly-drying oil; by keeping the mixture stirred, that is to say, by always exposing fresh portions to air, the drying property of the oil is greatly promoted. The rapidity of the drying of the oil after it has been mixed with paint, on surfaces besmeared therewith, does not simply depend upon the drying property of the oil, but, in a very great measure, upon the state of the atmosphere—viz., whether dry or moist, hot or cold—the direct action of sunlight, and the state of the surfaces on which the paint is brought. Really genuine boiled linseed oil, if well prepared, leaves nothing to be desired as regards rapidity of drying, but it is retarded by various substances which are added in practice, among which, especially, oil of turpentine is injurious.

OIL, Furniture.—Take linseed oil, put it into a glazed pipkin with as much alkanet root as it will cover. Let it boil gently, and it will become of a strong red color; when cool, it will be fit for use.

OIL, (Prepared) For Carriage etc.—To 1 gallon linseed oil add 2 lbs. gum shellac; litharge, $\frac{1}{2}$ lb.; red lead, $\frac{1}{4}$ lb.; umber, 1 oz. Boil slowly as usual until the gums are dissolved; grind your paints in this (any color), and reduce with turpentine. Yellow ochre is used in floor painting.

PAINTING.—The value of paints prepared from oxides of iron is very generally overlooked by architects. These paints some men of experience pronounce to be superior to those prepared from the oxides of lead; at any rate, they answer equally well, and the cost is considerably less. But I propose to allude to the value of these paints, especially for use upon iron. It has been acknowledged for years that the oxides of lead, or copper, if put upon iron, will eat into it, and promote corrosion, and yet how frequently do we meet with the requirement that iron-work shall have a coat of red-lead before leaving the foundry: a worse provision could hardly be made, unless it be to specify verdigris, a preparation from copper; this also is sometimes used, though it eats holes into the iron in a very short time. Very shortly after iron-work is painted, the iron will be observed corroded, and the remark be upon every body's tongue, "This ought not to be going so soon, ought not to want painting so soon." The fact is, lead has been put upon it, and nothing else could be expected. The reason red or white lead causes metal to corrode so quickly is explained thus: directly the air gets to the metal, not only does natural corrosion take place, but a chemical action sets in between the lead and the iron, and increases the corrosion. No harm can result from painting iron with red or white lead, so long as the oxygen of the air, or water, does not get to the metal; but as it is almost sure to do so, it is best not to run the risk. The same quantity of paint, made from the oxide of iron, will cover a surface of twice

the area as that of paint prepared from lead, though the price is much less. Aqua fortis, one of the strongest acids, if poured upon red or white lead, will fuse it instantly, but has no effect upon paint prepared from the oxide of iron. With regard to the numerous anti-corrosive paints in existence, I may say, in one word, it is of no use trying to cheat nature; anti-corrosive paints will not answer the purpose their names imply: all paints must yield eventually to the action of the oxygen, and the work be repainted, and for many reasons it is well that all work should be repainted at proper intervals. All that can be done to attain the objects of such paints is to so pick and form the stuff as to reduce the power of the elements to affect it to a minimum. This is found best secured when the composition forming the paint is granular, not so finely powdered as ordinarily. The finer the powder of the mixture, the greater the tendency for air-holes to form, as the paint is being laid on; paint that is more gritty, or granular, affords a better opportunity for the air to escape, and therefore reduces the liability of corrosion to the utmost limit. The coating of oil is the best preservative, and not the paint mixtures; and therefore those mixtures which, like lamp-black, go a long way in mixing with oil, answer better than those that require more of the mixture to form the paint. For covering urinals or other work exposed to the influence of strong acid, black varnish is the best article to use; it should be frequently applied, and is inexpensive. Woodwork before painting ought to be well soaked with good priming, principally turpentine; this keeps damp out of the wood; a coat of paint has not the same power, as it forms a skin on the wood, instead of soaking into it. The priming should pass over all the woodwork, where exposed; otherwise damp may come into contact with the portion not primed, and it will find its way down the wood, and cause blisters in the paint, where we have thought them unlikely; blistering is often a result of insufficient priming. Painters, as a rule, neglect to prime the tops of outside doors; damp gets down the wood, and blistering results. Knots will sometimes show through paint-work, and lead to the inference that no knotting has been used, whereas the effect may be merely the result of using inferior stuff. It is of great importance that knotting of good quality be used; it may be purchased at half the cost of the well known patent knotting, but will answer no purpose. The best driers are prepared from sugar of lead; the lighter the driers the better their quality. The quantity of driers required depends upon the time of the year the paint is used, and the character of the oil. There is a great deal of bad oil in use now, distilled, or by other means prepared from resin; this will not dry properly, do what you will with it, and it should be condemned for paint-work at once. It does not cost half so much as linseed oil, and there is, therefore, at all times danger of it getting into our work. When fresh, and sometimes when of long standing, it may be killed by an application of petroleum spirit, or potash; but generally, when this oil proves to be in the paint, the best course is to scrape the whole off with salamancas, or hot irons, in the usual way. No oil will answer so well as linseed oil, well boiled or raw, when there is not the necessity for so much driers; raw oil may be used in summer weather, and should always be used

for white paints, as the boiled oil discolors them; driers in this latter case must be added. Often when we specify the best copal varnish, we get nothing but common oak, though the difference in cost may be from seven shillings to twenty-one per gallon. The best proceeding for the architect is to price the varnish, and take special means for obtaining it. For ordinary purposes, where we usually specify common oak varnish, copal varnish diluted with oil answers better, and in practice is often adopted.

PAINTING, Rules for.—1. Let the ground-work be carefully prepared and dry.—2. See that the colors are well ground and duly mixed.—3. Do not mix much more, nor any less paint than you think will be necessary for the present work.—4. Keep the paint well mixed before using.—5. See that the paint is neither too thick to work well, nor too thin to cover properly, and apply it evenly.—6. Do not apply a succeeding coat before the previous one is dry.—7. Do not use a lighter color over a darker.—8. Do not add driers to colors long before using.—9. Use just as little driers as will do the work.—10. Do not overcharge the brush with paint.—11. Begin with the highest part of your work and proceed downward.

PAINTING Outside Houses.—Repeated experiments prove that paint applied between November and March, will last twice as long as that applied in warm weather. The reason is that in cold weather the component parts of the paint form a hard substance on the surface; almost as hard as glass; but in warm weather the oil penetrates the boards and the paint wears off.

PAINTS, To Mix.—In mixing paints, observe, that for out-door work you must use principally, or wholly, boiled oil, unless it is for the decorative parts of houses, etc., then mix as for in-door work.

For in-door work use linseed oil, turpentine, and a little driers, observing that the less oil, the less will be the gloss, and that for flatted white, etc., the color being ground in oil, will scarcely require any further addition of that article, as the object is to have it dull.

PAINT, Flexible.—Yellow soap cut into slices, $1\frac{1}{2}$ lbs.; boiling water, 1 gall.; dissolve and mix while hot with oil paint, $1\frac{1}{4}$ cwt. Used to paint canvass.

PAINT (Cheap), for Fences, etc.—1. Take a bushel of well burnt lime, white and unslacked; 20 pounds of Spanish whiting, 17 pounds of rock salt, and 12 pounds of brown sugar. Slake the lime and sift out any coarse lumps and mix it into a good whitewash with about 40 gallons of water, and then add the other ingredients, and stir the whole together thoroughly, and put on two or three coats with a common brush. This is a cheap paint. Five dollars' worth ought to make the building look a hundred dollars' worth better. This makes a coat that does not wash off, or easily rub off, and it looks well, while it will go far to preserve the wood. It is, therefore, especially adapted to the outside of buildings that are exposed to the weather. Three coats are needed on brick and two on wood. If you want to get a fine cream color, add three pounds of yellow ochre to the above. If you prefer a fawn color, add four pounds of umber, one pound of Indian red, and one pound of lamp-black. If you want a gray or stone color, add four pounds of raw umber and two pounds of lamp-black. This will be more durable than

common whitewash. — 2. Take freshly-burned unslaked lime and reduce it to powder. To one peck or one bushel of this add the same quantity of fine white sand or fine coal ashes, and twice as much fresh wood ashes, all these being sifted through a fine sieve. They should then be thoroughly mixed together while dry. Afterwards mix them with as much common linseed oil as will make the whole thin enough to work freely with a painter's brush. This will make a paint of light gray stone color, nearly white. To make it fawn or drab, add yellow ochre and Indian red; if drab is desired, add, burnt umber, Indian red, and a little black; if dark stone color, add lamp-black; or if brown stone, then add Spanish brown. All these colors should, of course, be first mixed in oil and then added. This paint is much cheaper than common oil paint. It is equally well suited to wood, brick, or stone. It is better to apply it in two coats; the first thin, the second thick.

PAINT, MILK, for Barns, etc.—Mix water lime with skim-milk, to a proper consistence to apply with a brush, and it is ready to use. It will adhere well to wood, whether smooth or rough, to brick, mortar or stone, where oil has not been used, (in which case it cleaves to some extent,) and forms a very hard substance, as durable as the best oil paint. It is too cheap to estimate, and any one can put it on who can use a brush.

PAINT, Petroleum as.—This can be used to great advantage on a farm as a preserver of wood. It is not properly a paint. No coloring matter should ever be mixed with it. Ordinary linseed-oil paint preserves wood by forming a coat that excludes the atmosphere from the pores. Petroleum penetrates the wood and excludes the air by filling up the pores.

Old barns from which the paint is worn off will be much improved by a liberal coat of petroleum. It can be put on with a whitewash brush. The point is to get on as much as the wood will absorb. It is better to go over the work rapidly and then the next day go over it again. For shingle roofs, new or old, nothing is better than petroleum. In making a new roof we would dip the shingles by the bunch in petroleum, until they were saturated, before putting them on. This would save the expense of applying it on the roof with a brush.

The sills and timbers of barns and other buildings, in the parts most liable to decay, should be treated with petroleum. A good way to do this is to bore a hole with an auger into the stick of timber, and fill it with the oil, and as it is absorbed, add more. The hole should afterwards be plugged up. The ends of all the timber should also be washed over repeatedly with petroleum before being put into the building. In this way soft maple, black ash, and bass wood may be made durable timber, and as useful as oak when strength is not required.

PAINT SKINS.—Dissolve sal-soda, $\frac{1}{2}$ lb., in rain-water, 1 gal. The skins that dry upon the top of paint, which has been left standing for any length of time, may be made fit for use again by covering them with the sal-soda-water and soaking them therein for a couple of days; then heat them, adding oil to reduce the mixture to a proper consistence for painting, and straining. Painters who are doing extensive business will save many dollars yearly by this simple process.

PAINT (Oil), To Reduce with Water.—Gum

shellac, 1 lb.; sal-soda, $\frac{1}{2}$ lb.; water, 3 parts; boil all together in a kettle, stirring till dissolved. If it does not all dissolve, add a little more sal-soda; when cool, bottle for use; mix up 2 quarts of oil paint as usual, any color desired, using no turpentine, put 1 pint of the gum shellac mixture with the oil paint when it becomes thick; it can then be reduced with water to a proper thickness to lay on with a brush.

PAPER HANGING.—The first thing to be thought of is the selection of paper hangings. According to the taste or judgment with which the pattern is chosen, so will the appearance of the room, when prepared, be agreeable or displeasing. Large patterns should, of course, be only used in large rooms. Dark-tinted papers are most suitable for light rooms, and light papers for dark rooms; many a dingy or gloomy apartment may be made to wear a cheerful aspect by attention to this particular. Stripes, whether on a lady's dress, or on the walls of a room, always give the effect of height; consequently a low room is improved by being hung with a striped paper. The effect is produced by a wavy stripe as well as a straight one, and, as curved lines are the most graceful, they should generally be preferred. Any pattern with lines crossed so as to form a square, is unsuitable for a low room; but with the lines made sloping or diagonal, there is not the same objection. A diamond trellis pattern, with a small plant creeping over it, looks well in a small summer parlor. For a common sitting-room, a small geometrical pattern is very suitable; being well covered, it does not show accidental stains or bruises, and, in the constant repetition of the design, there is no one object to attract the eye more than another. These are sometimes called Elizabethan patterns; they are much used for staircases, halls, and passages, but they are not to be chosen at random. According to the height and dimensions of the passage or staircase, such should be the pattern. A large pattern on a narrow staircase, and in a passage not more than eight feet in height, has a very heavy and disagreeable effect. A light gray, or yellow marble, divided into blocks by thin lines, and varnished, will be found suitable for most passages, if care be taken to adapt the size of the blocks to the place where they are to appear. A size that would look well in a hall twenty feet wide, would be altogether too large in one of only four or six feet. Many persons must have noticed, in their visits of business or pleasure, that some houses present a cheerful aspect as soon as the door is opened, while others look so dull that they make one low-spirited upon entering them. The difference is caused by the good or bad taste with which they have been papered and painted. A safe rule with regard to paper-hangings, is to choose nothing that looks extravagant or unnatural. Regard should be had to the uses of an apartment; a drawing-room should be light and cheerful; a parlor should look warm and comfortable without being gloomy; bedroom papers should be cool and quiet, and generally of a small pattern, and of such colors as harmonize with bed-furniture and other fittings. It is worth while to consider the sort of pictures to be hung on a wall; gilt frames show best on a dark ground, and dark frames on a light ground; taking care however to avoid violent contrasts. Heavy borders are seldom used now; they make a room low, without being ornamental.

The paper being purchased, the walls should next be looked to, in order to be sure that they are in proper condition to hold the paper. A new unwhitewashed wall will absorb the paste so rapidly that, before drying, there will be left too little body of paste on the surface to hold the paper. A coating of good glue size, made by dissolving a half a pound of glue in a gallon of water, or a coating of good paste, put on and allowed to dry before the paper is hung, will provide for this difficulty.

If the wall has already been papered it should be removed. Many lives have been lost from the laziness or ignorance of paper-hangers, who have laid on one paper above another, instead of tearing off the old one before hanging the new. There was a very handsome house near one of our provincial towns which could never keep its tenants, and at last stood empty and became worthless, because a detestable fever seized upon every family that lived in it. A ready-witted observer promised the owner to find out the cause. He traced the mischief to one room, and presently conjectured what was the matter there. He let a slip of glass into the wall, and found it the next day dimmed with a foetid condensed vapor. He tore down a strip of paper, and found abundant cause for any amount of fever. For generations the walls had been papered afresh, without the removal of anything underneath. And there was the putrid size of old paper inches deep! A thorough clearance, and scraping, and cleaning, put an end to the fever, and restored the value of the house.

If the wall be whitewashed, it should be scratched with a stiff brush, to remove every particle of loose lime from the surface; after which it should be thoroughly swept down with a broom, and coated with the glue size or thin paste.

A long table of thin boards cleated together and placed on wooden horses, such as are used by carpenters, a pair of sharp shears—with long blades if possible—a whitewash brush, a pail for paste, and a yard of cotton cloth, are the implements required. The table or board platform should be level on its upper surface to facilitate the distribution of the paste. The latter should be free from lumps, and should be laid on as evenly as possible. It should be made of good sweet rye or wheat flour, beaten smooth in cold water before boiling, and should not be allowed to boil more than a minute or two, but should be raised to the boiling point slowly, being continually stirred till it is taken from the fire.

Inexpert hands often find difficulty in making the patterns match in the juxtaposed pieces. No general directions can be given for this, but a little study at the outset will often save cutting to waste, and other difficulties. In this matter, as in others, it is wise to "first be sure you are right, then go ahead." As soon as the proper way to cut the paper is decided upon, a whole roll, or more, may be cut at once, and the pieces laid, printed side downwards, upon the table, weights being placed upon the ends to prevent curling. The paste should then be applied to the back of the uppermost piece, as expeditiously as possible, as the longer the time employed in this part of the operation, the more tender will be the paper get, and the more difficult it will be to lay it properly.

The upper end of the piece should then be taken by the corners, and the operator, stepping

upon a bench or step-ladder, should barely stick the piece at the top, and in such a manner that the edge shall coincide with the piece previously hung; this can be done by sighting down the trimmed edge of the piece, while it is held in the hands. The cloth should now be held in a loose bunch, and the paper smoothed with it from top to bottom, care being taken to work out all air from under the paper, which, if not thoroughly done, will give it a very unsightly blistered appearance.

If the wall be uneven or crooked, as is often the case in old houses, it will be difficult to avoid wrinkles, but they can be mostly got rid of, by cutting the paper and allowing the cut edges to lap over each other, in places where there would otherwise be a wrinkle.

By following these directions the most inexperienced will be able to do a reasonably tidy piece of work, but of course much skill is only secured by practice.

PAPER HANGING, Improved Paste for.—A new form of paste for attaching paper hangings to walls, and one which, besides possessing the merit of cheapness, has the advantage of preventing the paper from separating or peeling off, is prepared by first softening 18 pounds of finely powdered bole in water, and then draining off the surplus water from the mass. One and a quarter pounds of glue are next to be boiled into glue water, and the bole and two pounds of gypsum are then stirred in, and the whole mass forced through a sieve by means of a brush. This is afterwards diluted with water to the condition of a thin paste or dressing, when it is ready for use. This paste is not only much cheaper than the ordinary flour paste, but it has the advantage of adhering better to whitewashed surfaces, especially to walls that have been coated over several times, and from which the coating has not been carefully removed. In some cases it is advisable, when putting fine paper on old walls, to coat them by means of this paste with a ground paper, and to apply the paper hanging itself to this with the ordinary paste.

POLISH, French.—Gum sandarach, fourteen ounces and two drachms; gum mastic in drops, seven ounces and one drachm; shellac (the yellower the better), fourteen ounces and two drachms; alcohol. of 0.8295 sp. gr. three quarts one pint.

Pound the resinous gums, and effect their solution by continued agitation, without the aid of heat.

If the woods are porous, seven ounces and one drachm of Venice turpentine.

If also an equal weight of ground glass with the gums be added, the solution will be more quickly made, and otherwise benefited by it. Before using, the wood should be made to imbibe a little linseed oil, the excess of which should be removed by an old flannel.

The varnish should be applied by saturating a piece of old soft coarse linen cloth, folded into a sort of cushion, rubbing the wood softly at first, turning the linen from time to time until nearly dry. The linen should be saturated afresh, and the rubbing continued until the pores of the wood are completely filled.

Two or three coats are generally sufficient. Do not rub hard. If the varnish become sticky, apply a very little drop of olive oil uniformly over the surface of the cushion.

The finishing process consists in pouring a little pure alcohol upon a clean piece of linen, which is lightly rubbed over the varnished wood, and as the linen and varnish dry, the wood is rubbed more briskly, until it takes a beautiful polish like a looking-glass.

The above may be relied upon as the original and genuine French polish, it being in the *Dictionnaire Technologique*, an accurate French work.

POLISHING WOOD CARVING.—Take a piece of wadding, soft and pliable, and drop a few drops of white or transparent polish, or French polish, according to the color of the wood. Now wrap the wetted wadding up in a piece of old linen, forming it into a pad; hold the pad by the surplus linen; touch the pad with one or two drops of linseed oil. Now pass the pad gently over the parts to be polished, working it round in small circles, occasionally re-wetting the wadding in polish, and the pad with a drop or so of oil. The object of the oil is merely to cause the pad to run over the wood easily without sticking, therefore as little as possible should be used, as it tends to deaden the polish to a certain extent. Where a carving is to be polished after having been varnished, the same process is necessary; but it can only be applied to the plainer portions of the work. Plain surfaces must be made perfectly smooth with sand-paper before polishing, as every scratch or mark will show twice as badly after the operation. When the polish is first rubbed on the wood, it is called the "bodying-in;" it will sink into the wood and not give much glaze. It must, when dry, have another body rubbed on, and a third generally finishes it; but if not, the operations must be repeated. Just before the task is completed, greasy smears will show themselves; these will disappear by continuing the gentle rubbing without oiling the pad. You should now be able to see your face in the wood.

PRUSSIAN BLUE, Turnbull's.—Ferrocyanide of potassium, 10 ounces; solution tersulphate of iron, 1 pint; water, 3 pints. Dissolve the ferrocyanide of potassium in two parts of water, and add the solution, gradually, to the solution of tersulphate of iron previously diluted with the remainder of the water, stirring the mixture during the addition. Then filter the liquid and wash the precipitate on the filter with boiling water until the washings pass nearly tasteless. Lastly, dry it, and rub it into fine powder.

PUMICE STONE.—This is the lava of the volcanoes, is found floating upon the surface of the sea. It is a very useful article, which should be used much more than it is for rubbing down painted work.

PUTTY, To Soften when Hard.—Break the putty in lumps of the size of a hen's egg, add a small portion of linseed oil, and water sufficient to cover the putty; boil this in an iron vessel for about ten minutes, and stir it when hot. The oil will mix with the putty. Then pour the water off, and it will be like fresh made. For removing hard putty from a window-sash, take a square piece of iron, make the same red hot, and run it along the putty till it gets soft. The putty will peel off without injuring the wood work. Concentrated lye, made of lime and alkali will affect the wood and make it rot quicker.

REDS.—Reds have their bases in iron mostly, and some have supposed that all reds are depend-

ent upon the presence of iron for their color. — *Carmin* is kaolin, or China clay, colored with cochineal, and being prepared with much difficulty, it is very expensive. A common article is composed of alum and cream of tartar, colored with cochineal. This color fades rapidly on exposure to the sun, and is of little use in out-door work. It is a rich, transparent color. — *Vermilion* is composed of sulphur and quicksilver. The first quality, at present, comes from France, it being difficult to get Chinese vermilion that is free from pulverized glass; in fact, the greater portion of the Chinese vermilion now in the market is almost worthless in consequence of this adulteration. The English and American vermilions are cheaper, and inferior in color rather than quantity. — *Chrome Red*, or American vermilion, as it is sometimes called, though not so fine a color when first used, is much cheaper than vermilion, being one fifth the price; it stands exposure much better, retaining its hue long after the best Chinese has turned brown. For this reason it is much better adapted to all out-door painting. Its composition is saltpetre and chrome yellow, produced by a process of heating and washing. — *Rose Pink* is nothing more than whitening, tintured with Brazil wood, and is of little service in out-door painting, as it immediately fades on exposure to light. It is cheap, and being transparent, does very well for a glaze for chairs or other furniture. — *Red Lead*, or red oxide of lead, is of more use in boiling in oil to make it dry than anything else. It is not much used among painters on account of its fading quality, though it is used in some compound mixtures. With chrome yellow, it makes a rich ground for mahogany. It is a durable color, and is therefore preferred by wheelwrights for painting wagons. — *Madder Lake* is the only lake that does not fade. A fine, transparent glaze for beautiful and delicate work, but too expensive for common work. Its composition is alum and soda, or silicate of potash, or kaolin colored with madder. — *Venetian Red* is an earth, found in various parts of the world. It is the principal body used for all common purposes.

RED LEAD, How Made.—A quantity of lead is placed on the bed of a reverberatory furnace of a peculiar construction, and exposed to a high temperature, while the metal is constantly agitated by striking it upon the surface with a rake. A combination takes place between the lead and the oxygen of the atmosphere, and the oxide of lead thus formed is removed by the rake to the back of the furnace. These operations are continued during a period of twelve hours, at the expiration of which time any metallic lead which may have failed to become oxidized is removed, and the remaining oxide is exposed, by constant turning, to the action of the air, and, at the termination of a further period of twelve hours, is withdrawn from the furnace. The substance thus produced, which is called litharge, is now ground to an impalpable powder with water, and flows into a series of tubs, where it is kept in a state of agitation by a revolving stirrer furnished with arms. The particles of metal which have escaped oxidation, having a greater specific gravity in them than the oxide, remain in the stirring tubs, while the oxide of lead passes on into another series of tubs, where it subsides from the water. The supernatant water is afterward removed by a syphon, and the moist litharge

transferred to a reverberatory furnace, where it is exposed to the combined action of a low temperature and a current of air for a period of twenty-four hours. During this process, the litharge enters into combination with a further quantity of oxygen, and minium or red lead is produced. The manufacture is completed by passing the substance through a revolving cylinder of wire gauze, to remove any lumps that may have been formed, or any large particles of foreign matter with which it may have become intermixed during the previous operations.

ROSEWOOD, To Imitate.—Boil half a pound logwood in three pints water, till the mixture is of a very dark red; add half an ounce salt of tartar. While boiling hot, stain your wood with two or three coats, taking care that it nearly dries between each; then, with a stiff, flat brush, such as is used for graining, form streaks with the following black stain: Boil one pound logwood in four quarts water; add a double handful of walnut peel or shells; boil it up again, take out the chips, add a pint best vinegar, and it will be fit for use; apply while hot. All this, if carefully executed, will produce very nearly the appearance of dark rosewood.

RULES FOR PAINTERS.—1. Avoid spattering, for it is unpleasant as well as dangerous to be continually enveloped in robes of poisonous paint.—2. Never attempt to eat or sleep without first washing the hands and face and rinsing the mouth.—3. Wash the whole surface of the body at least once a week, with soft water.—4. Keep the buckets, brushes, etc., clean, so that they may be handled without smearing the hands.—5. Every painter should wear overalls, or change his clothing throughout once a week at least, in the mean time thoroughly airing those he has thrown off.—6. Keep the shops clean and well ventilated.—7. Never sleep in a paint-shop, nor in a newly-painted room, nor paint the walls of a room with any of the metallic greens.—8. Never suffer the paint to accumulate upon the clothing, nor upon the finger nails.—9. Never wash the hands in turpentine, as it relaxes the muscles and injures the joints. Any animal oil, or even linseed oil, is better.—10. Never drink water that has stood any length of time in a paint-shop, or in a newly-painted room.—11. Never use spirituous liquors, especially when ailing from the effect of paint, as it unites with the mineral salts and tends to harden them, and causes inflammation of the parts where they congregate.—12. Milk, sweet oil, and the like, should be used freely, as they tend to soften the accumulated poisons, and carry them off.—13. Vinegar and acid fruits, used constantly, unite with the lead that may be in the stomach, chemically changing it to the acetate, or sugar of lead, which is by far the least dangerous. Acetate of lead is scarcely recognized, in medical jurisprudence, as a poison.—14. Avoid breathing the dust when emptying papers of dry colors.—15. Make your smalls where there is a current of air; and, while stirring, stand to the windward, that you may not inhale the smoke.

SIZE, GOLD.—Yellow ochre, 1 part; copal varnish, 2 parts; linseed oil, 3 parts; turpentine, 4 parts; boiled oil, 5 parts. Mix. The ochre must be in the state of the finest powder, and ground with a little of the oil before mixing.

SIZE, Best.—Raw oil, heated in a pan till it gives out a black smoke. Set fire to it and let it

burn a few minutes. Extinguish it by covering the pan over. Pour, while warm, into a bottle containing pulverized red lead and litharge. Keep in a warm place, slaking often, for two weeks, then decant and bottle.

SIZE, Bronzing.—Asphaltum, boiled oil, and turpentine, mixed in proportions to flow evenly.

SIZE, Inside.—Honey, diluted with water, vinegar, or any liquor. Glue size, beer or ale, white of egg, gum arabic, or any glutinous or albuminous substance may be used.

SOLUBLE GLASS, in Painting.—Soluble glass appears to furnish a means of applying certain colors to fresh wood, or clean iron, in a most efficient manner, and at a very slight cost compared with oil. It can also be used advantageously for painting houses, basket ware, decorations for theatres, etc., and is especially suitable in the latter case, as it renders wood incombustible to a certain extent, instead of increasing the danger from fire, as with oil paint. Care must, of course, be taken to use only such mineral colors as are not decomposed by the glass, such as ultramarine, chrome green, Nuremberg green, yellow and red earth ochre, green earth, terra de sienna, etc. In coating paper with this paint a little glycerine may be added to prevent its breaking. Coralline, Ponceau and Vesuvine have also been used to advantage in connection with soluble glass.

STAIN (Black), for Wood.—Pour 2 qts. boiling water over 1 oz. of powdered extract of logwood, and, when the solution is effected, 1 dr. of yellow chromate of potash is added, and the whole well stirred. It is then ready for use as a wood-stain, or for writing-ink. When rubbed on wood, it produces a pure black. Repeat with two, three or four applications, till a deep black is produced, which acquires the highest beauty when polished or stained.

STAIN, Blue.—1. Solution of sulphate of indigo is used hot, and while hot, a solution of cream of tartar, 3 oz., in water, 1 qt.—2. A solution of verditer is brushed over until the wood appears a dark green, and then a hot solution is applied of pearlash, 2 ozs., in boiling water, 1 pint.

STAIN, Cherry.—Take rain water, 3 qts.; anotta, 4 ozs.; boil in a copper kettle until the anotta is dissolved; then put in a piece of potash the size of a common walnut, and keep it on the fire about half an hour longer, and it is ready for use. Bottle for keeping.

STAIN, Ebony.—Take a solution of sulphate of iron, and wash the wood over with it two or three times: let it dry, and apply two or three coats of a strong decoction of logwood; wipe the wood when dry with a sponge and water, and polish with oil.

STAIN, Purple.—Logwood, 1 lb.; Brazil wood, 4 ozs.; water, 1 gallon; boil 3 hours, brush it on while hot, and when dry, use a solution of pearlash, 1 drachm, in water, 1 quart.

STAIN, Red.—1. water, 1 gallon, Brazil wood, 1 lb.; pearlash, 1 oz.; boil for 3 hours, brush it hot over the wood, and then, while wet, brush the wood with a solution of alum, 2 ozs., in water, 1 quart.—2. *Light.* Add to each gallon of the last 2 ozs. more pearlash.—3. *Dark.* Logwood, 8 ozs.; water, 2 quarts; boil till of a deep color, and add carbonate of potash, $\frac{1}{2}$ oz.; brush it hot over the wood.

STAIN, Rosewood.—Take equal parts of

logwood and redwood chips, and boil well in just sufficient water to make a strong stain; apply it to the furniture while hot, 1 or 2, or even 3 coats may be put on, one directly after the other, according to the depth of color desired.

STAIN, Yellow.—1. Water, 1 gallon; French berries, 1 lb.; alum, $\frac{1}{2}$ oz.; boil for 2 hours, and use it hot.—2. Logwood decoction without a mordant.—3. Spirit of wine, 1 pint; turmeric, 1 oz.; digest 14 days, and strain.

STAIN, Bright Yellow.—1. Brush over with the tincture of turmeric.—2. Warm the work, and brush it over with weak aquafortis: varnish or oil as usual.—3. A very small bit of aloes put into the varnish will give a rich yellow color to the wood.

STAIN for FLOORS.—To strong lye of wood-ashes add enough copperas for the required oak shade. Put this on with a mop, and varnish afterwards.

TIMBER, Why it should be painted.—When water is applied to the smooth surface of timber, a thin layer of the wood will be raised above its natural position by the expansion or swelling of the particles near the surface. In colloquial phrase, workmen say that when water is applied to a smooth board, the grain of the timber will be raised. Every successive wetting will raise the grain more and more; and the water will dissolve and wash away the soluble portions with which it comes in contact. As the surface dries, the grain of the timber at the surface, having been reduced in bulk, must necessarily shrink to such an extent as to produce cracks. Now, if a piece of oil-cloth be pasted over the surface, the timber will be kept quite dry. Consequently, the grain of the wood will not be subjected to the alternate influences of wet and heat. As it is not practicable to apply oil-cloth ready made, a liquid or semi-liquid material is employed for covering the surface, which will adhere firmly, and serve the purpose of oil-cloth in excluding water that would otherwise enter, to the injury of the work. Metallic substances are painted to prevent oxidation or rusting of the surfaces which may be exposed to moisture.

It is of primary importance to make use of such materials as will form over the surface a smooth and tenacious pellicle, impervious to water. Any material that will not exclude water sufficiently to prevent the expansion of the grain of the timber, or the oxidation of metallic substances, must be comparatively worthless for paint. Linseed-oil possesses the property of drying when spread on a surface, and forming a tenacious covering, impervious to water. Spirits of turpentine, benzine, benzole, and certain kinds of lubricating oil, all of which are frequently used in preparing paint, will not form a covering sufficiently tough and hard to resist the action of water; for which reason, the paint that is made by employing these volatile materials will be found comparatively worthless for outside work. A pigment is mingled with the oil to prevent the timber to which the paint is applied from absorbing the oil. The design is not to saturate the wood with oil, but simply to cover the surface with a coating resembling a thin oil-cloth.

TINTS, Mixing.—The first principle in mixing tints is to take the body color, or that ingredient which predominates, and add to it, gradually, the other colors. The principal ingredient may be thick, but the others must invariably be

thin, or the lumps will spread out under the brush, leaving a streak of corresponding color.

In describing the manner of mixing tints, the predominant color will be mentioned first, the second next, and so on, as it would be impossible to give the exact proportion of each color used in any given tint. Thus, for instance, violet is mostly red, the next in quantity blue, and the least white, and so on. In this manner the following table exhibits almost every tint which the painter will be likely to require, leaving to his taste the peculiar tone:—

Table of Tints, and the Colors necessary to produce them.

Gray,	White Lead and Lampblack.
Buff,	White and Yellow Ochre; Red.
Pearl,	White, Black, Blue.
Orange,	Yellow, Red.
Violet,	Red, Blue, White.
Purple	Violet, with the addition of Red and White.
Gold,	White Stone Ochre; Red.
Olive,	Yellow, Blue, Black, White.
Chestnut,	Red, Black, Yellow.
Flesh,	White, Yellow Ochre, Vermilion.
Limestone,	White, Yellow Ochre, Black, Red.
Sandstone,	White, Yellow Ochre, Black, Red.
Freestone,	Red, Black, Yellow Ochre, White.
Fawn,	White, Yellow, Red.
Chocolate,	Raw Umber, Red, Black.
Drab,	White, Raw, and Burnt Umbers; or White, Yellow Ochre, Red, Black.
Bronze Green,	Chrome Green, Black, Yellow, or Black and Yellow, or Black and Green.
Pea Green,	White and Chrome Green.
Rose,	White, Madder Lake.
Copper,	Red, Yellow, Black.
Lemon,	White, Yellow.
Snuff,	Yellow, Vandyke Brown.
Claret,	Red, Umber, Black.
Dove,	White, Vermilion, Blue, Yellow.
Pink,	White, Vermilion, Lake.
Cream,	White, Yellow.
Salmon,	White, Yellow, Raw Umber, Red.
Straw,	White, Chrome Yellow.
Peach Blossom,	White, Red, Blue, Yellow.
Lilac,	White, with Violet.
Changeable,	Red, Green, lightened with White.

Remarks.—Any of the positive colors are made to any degree of lightness with white or yellow.

Colors for tints work best when mixed with raw oil.

All tints must be graduated by the taste of the artist, recollecting that practice and experience are great helps.

The finer the quality of the colors used, the purer and more beautiful will be the tints.

All colors should be ground before mixing, as the dry color does not stir in well.

ULTRAMARINE.—A vitreous matter colored by oxide of cobalt, gives a tone of color different from that of the prussiate of iron and indigo. It is employed for sky-blues. The case is the same with blue verditer, a preparation made from oxide of copper and lime. Both these blues stand well in distemper, in varnish, and in oil.

Saxon blue requires to be ground with drying oil, and to be mixed with gallipot varnish. If intended for oil painting, it is to be mixed up with resinous drying oil, which gives body to this vitreous matter.

ULTRAMARINE, Artificial.—Sulphur, 2 parts; dry carbonate of soda, 1 part. Put them into a Hessian crucible, cover it up, and apply heat until the mass fuses; then sprinkle into it gradually a mixture of silicate of soda and aluminate of soda (the first containing 72 parts of silica, the second, 70 parts of alumina); lastly, calcine for 1 hour, and wash in pure water.

ULTRAMARINE. *To know when Adulterated.*—As the price of ultramarine, which is already very high, may become more so on account of the difficulty of obtaining lapis lazuli, it is of great importance that painters should be able to detect adulteration. Ultramarine is pure if, when brought to a red heat in a crucible, it stands that trial without changing its color; as small quantities only are subjected to this test, a comparison may be made, at very little expense, with the part which has not been exposed to the fire. If adulterated, it becomes blackish or paler.

This proof, however, may not always be conclusive. When ultramarine of the lowest quality is mixed with azure, it exhibits no more body than sand ground on porphyry would do; ultramarine treated with oil assumes a brown tint.

VARNISHING.—All work before being varnished, should be prepared with a dead surface, either by mixing with turpentine or by rubbing down with pumice stone. In very finely finished work, requiring a level surface, rub down with solid pumice stone and water; where only smoothness is necessary, rub with pulverized pumice stone with water, using for a rubber any woolen cloth, or felt, or buckskin.—*The first Coats* should be spread on evenly, and well rubbed out. Two, or four, or six coats may be given without rubbing; then, previous to the last coat, rub till the gloss is destroyed, after which give it a heavy flowing coat.—*The Flowing Coat.* Where work is to be finished on a cheaper plan, the rubbing need not be done. In this case give two or three coats, well rubbed out, and while the last coat is quite sticky, so as to make the brush drag through a little toughly, put on a heavy flowing coat of thick varnish—put on so heavily that it will flow evenly of itself. This, after thoroughly dry, may be polished.—*Polishing.* Rub down with finely pulverized pumice stone till smooth and even; wash off. Then rub with rotten stone and sweet oil. Clean off the oil, and polish with chamois leather. Some use only the hand to finish with, which is quite as good after being rubbed with rotten stone and sweet oil. If the under coats of paint are not thoroughly dry, the varnish will be apt to crack.

VARNISHING, Cleaning Paint Previous to.—Provide a plate, with some of the best whitening to be found in the market, and have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whitening as will adhere to it; apply it to the painted surface, when a little rubbing will instantly remove any dirt or grease; after which wash the part well with clean water, rubbing it dry with a soft cloth or chamois. Paint thus cleaned looks as well as when first laid on, without any injury to the most delicate colors. It is far better than cleaning it with soap, and does not require more than half the time usually employed in cleaning with that article.

VARNISH, Manufacture of.—The varnish we shall more particularly describe is that made by intimately mixing gum copal with linseed oil and diluting the mixture with turpentine—the preparation of which requires no small amount of care and attention, and was formerly attended with no little danger from fire. Copal is a resin found exuding from the *Rhus copallinum*, a tree growing in several parts of America, and from

the *Elaeocarpus copallifera*, a tree found in the East Indies; it is also imported from the coasts of Guinea. The two latter kinds are generally allowed to be the best, and are commonly known as African.

The object to be obtained in the preparation of varnish is to impart to it a quick-drying property, retaining at the same time transparency and elasticity. To secure these characteristics great care is necessary, in melting the gum, in boiling that and the oil together for the requisite time and at the proper degree of heat, and in the complete solution of the resinous matter employed. To achieve these results a pure and limpid sample of oil is generally chosen, which is placed in a copper pan holding from 80 to 100 gallons, and heat gradually applied till the scum rises; after removing which the oil is allowed to boil for about two hours, when it is dosed with calcined magnesia in the proportion of an ounce to every four gallons of oil, but added by degrees and with occasional stirrings. This being completed, the oil is again boiled briskly for about an hour, and then, the furnace being drawn, allowed to cool. When the temperature is sufficiently reduced, it is removed to leaden cisterns, where it is stored till fit for use.

Under the old system of making varnish, the gum pot and oil pot were open to the atmosphere of the shop in which the operation is performed; but the vapors arising during the process are now either taken into the furnace shaft, or condensed into liquid by suitable refrigerators. The *modus operandi* is somewhat as follows. The oil being placed in its boiler and approaching the requisite degree of temperature—namely, that at which the gum melts, the copal is placed in its copper, about 10 lb. being the usual quantity fused at a time. In a few minutes it begins to melt, and gives off unpleasant vapors. When thoroughly melted and clear a portion of the oil is added, and the mixture boiled and stirred till of the proper consistency; it is then taken and emptied into the boiling pot, from which the requisite quantity of oil for the following charges of gum has been previously withdrawn. The gum pot being thoroughly cleansed, another portion of the gum is placed in it and melted in a similar manner to the first, and so on, till sufficient gum has been fused for the quantity of oil prepared. The whole is then placed on the furnace and boiled till a scum rises and spreads gradually over the whole surface, which then froths up rapidly in the same way as boiling milk, and must be instantly removed, when the scum being stirred down, the dryers are added, a little at a time, and the boiling continued till the mixture feels stringy to the fingers. The boiling pot is then removed from the fire, and when sufficiently cool, turpentine is added till the desired consistency is attained, when the varnish may be placed in the storing tanks. Formerly a great waste of turpentine took place by evaporation through mixing it while the varnish was still too hot; but of late years a vast improvement has been adopted in this respect, and it has been practically demonstrated that not only is there no necessity for “boiling” the oil and gum after incorporation, but that the produce is equally good if the turpentine be added just before the mixture becomes too cold to permit of a perfect amalgamation. In fact, it is now acknowledged that the oil need not be raised to a higher temperature than that

at which the gum employed fuses, and that when the two are mixed the lowest possible degree of heat which will insure their incorporation, is sufficient to secure all the results desired. By this method a large quantity of the turpentine formerly lost in evaporation is saved, and there is, moreover, less risk of fire. It is indeed a moot point whether it is absolutely necessary to add turpentine in quantity at all, as even when the loss during the preparation of the varnish is reduced to a minimum, a still further reduction occurs whilst the varnish is ageing and clearing in the storing tanks, and it is sometimes found necessary to thin it before it can be used.

To prevent the workmen being distressed by the pungent odors of the melting gum, in modern varnish factories the boiling and gum pots are placed close together, and by means of caps and heads (provided with openings to facilitate stirring,) the pots are connected with chimneys which carry off all vapors into the smoke shaft, or to the condensing tanks. A close fitting cover is also provided for the boiling pot to extinguish the flames in case the oil should take fire—a great improvement on the old fashioned carpet, which an assistant stood ready to throw over in case of accident; while tramways are laid down so that the boiling mixtures can be rapidly conveyed into the open air in the event of firing, and for the purpose of cooling before the addition of the turpentine.

VARNISHES, Care of.—As a rule all varnishes should be kept in a dry place (there may be few exceptions), otherwise they are liable to become tacky. It should also be observed that they should be applied in a dry place. Much, indeed, depends upon the state of the weather when they are employed—more than is easily credited—and the work should be kept in a warm place until thoroughly dry.

All varnishes in which spirits of wine is the menstruum should be used in a warm place.

VARNISH-BRUSHES, Care of.—Brushes used for applying finishing varnishes should be cared for with the utmost pains, as good work depends much upon the good condition of the brushes. A good way to keep them is to suspend them by the handles in a covered can, keeping the points at least half an inch from the bottom, and apart from each other. The can should be filled with slow-drying varnish up to a line about a sixteenth of an inch above the bristles or hair. The can should then be kept in a close cupboard, or in a box fitted for the purpose. As wiping a brush on a sharp edge of tin will gradually split the bristles, cause them to curl backward, and eventually ruin the brush, the top of the can should have a wire soldered along the edge of the tin turned over, in order to prevent injury. Finishing brushes should not be cleansed in turpentine, except in extreme cases. When taken from the can, prepare them for use by working them out in varnish, and before replacing them cleanse the handles and binding with turpentine.

VARNISH, Amber.—1. Amber, 1 lb.; pale boiled oil, 10 oz.; turpentine, 1 pint. Render the amber, placed in an iron pot, semi-liquid by heat; then add the oil; mix, remove it from the fire, and when cooled a little, stir in the turpentine.—2. To the amber, melted as above, add 2 ozs. of shellac, and proceed as before. This varnish is rather dark, but remarkably tough. The

first form is the best. It is used for the same purposes as copal varnish, and forms an excellent article for covering wood, or any other substance not of a white or very pale color. It dries well, and is very hard and durable.

VARNISH, (Black) Amber.—Amber, 1 lb.; boiled oil, $\frac{1}{2}$ pint; powdered asphaltum, 6 ozs.; oil of turpentine, 1 pint. Melt the amber, as before described, then add the asphaltum, previously mixed with the cold oil, and afterwards heated very hot, mix well, remove the vessel from the fire, and when cooled a little add the turpentine, also made warm.

Each of the above varnishes should be reduced to a proper consistence with more turpentine if it be required. The last form produces the beautiful black varnish used by the coachmakers. Some manufacturers omit the whole or part of the asphaltum, and use the same quantity of clear black rosin instead, in which case the color is brought up by lampblack reduced to an impalpable powder, or previously ground very fine with a little boiled oil. The varnish made in this way, lacks, however, that richness, brilliancy, and depth of blackness imparted by asphaltum.

VARNISH, Black.—This is quick drying, and cheap for common purposes, such as iron fences and other rough work. Black Pitch, 28 pounds, Asphaltum, from Tar, 28 pounds. Boil eight or ten hours, then add 8 gallons boiled oil, and gradually 10 pounds red lead, and 10 pounds litharge. Boil for 3 hours longer, and add, when lukewarm, enough turpentine to thin for working freely.

This varnish will dry in a few minutes.

VARNISH, Black Copal.—Lampblack, made of burnt vine-twigs, or black of peach-stones. The lampblack must be carefully washed and afterwards dried. Washing carries off a great many of its impurities.

VARNISH, Black Japan.—Burnt umber 8 oz.; true asphaltum 3 or 4 oz.; boiled linseed oil 1 gallon; grind the umber with a little of the oil; add it to the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil, boil, cool, and thin with a sufficient quantity of oil of turpentine. Flexible.

VARNISH, Camphor.—Gum Copal, 4 ounces; oil lavender, 12 ounces; gum camphor, $\frac{1}{4}$ ounce. Heat the oil and camphor in a pan, stirring; then add the copal in small quantities.—When dissolved, stir and add turpentine almost in a boiling state.

This is transparent, pliable, and durable. For varnishing wire gauze, muslin, etc.

VARNISH, Caoutchouc.—Digest 2 parts of caoutchouc, cut in shreds or small pieces in 64 parts of rectified oil of turpentine; strain through a linen cloth.

VARNISH, Cabinet-makers.—Very pale shellac 5 lbs.; mastich 7 oz.; alcohol, of 90 per cent., 5 or 6 pints; dissolve in the cold with frequent stirring. Used for French polishing, etc. It is always opaque. A similar varnish, made with weaker spirit, is used by bookbinders to varnish morocco leather book covers.

VARNISH, cheap.—The beautiful varnish applied to Connecticut clockcases, wooden picture-frames, and other cheap objects, is in appearance equal to the elaborate finish of the finest furniture, such as pianos, etc. It is made by mixing two pounds of copal varnish with half an ounce of linseed-oil varnish. The mixture is shaken often

to mix it well, and is then placed on a warm spot. The wood to be varnished is prepared with a thin coat of glue-water, dried slowly, and rubbed down with fine pumice-stone or something equivalent. In light-colored wood, a light pigment, such as chalk, is added to the glue-water; in dark wood, an equally dark pigment is added. When ready, the articles are varnished with the above mixture, and, after drying, rubbed with a solution of wax in ether, thereby acquiring a high polish.

VARNISH, Coachmakers'. — The fine black varnish of the coachmakers is said to be prepared by melting 16 ounces of amber in an iron pot, adding to it half a pint of drying linseed-oil, boiling-hot, of powdered resin and asphaltum, 3 ounces each. When the materials are well united, by stirring over the fire, they are to be removed, and after cooling for some time, a pint of warm oil of turpentine is to be introduced.

VARNISH, Colorless. — Dissolve two ounces and a half of shellac in a pint of rectified spirits of wine; boil for a few minutes with five ounces of well-burned and recently-heated animal charcoal. A small portion of the solution should then be filtered, and if not colorless, more charcoal must be added. When all color is removed, press the liquor through a piece of silk, and afterward filter through fine blotting-paper. This kind of varnish should be used in a room of at least sixty degrees Fahr., perfectly free from dust. It dries in a few minutes, and is not liable afterward to chill or bloom. It is particularly applicable to drawings and prints that have been sized, and may be used for gilding.

VARNISH, Copal. — 1. Gum copal, 8 pounds; linseed oil, 2 gallons; sugar of lead, $\frac{1}{2}$ pound; turpentine, $\frac{3}{4}$ gallons. Boil till stringy. — 2. Gum copal, 8 pounds; oil, $2\frac{1}{2}$ gallons; sulphate of iron, $\frac{1}{4}$ pound; turpentine, $5\frac{1}{2}$ gallons. This is a good varnish for house and sign painting. In making the above varnishes, the gum should be melted in a small quantity of boiling oil, and poured gradually into the kettle containing the other oil, while boiling. When it is all done, and cool enough so as not to ignite the turpentine, the turpentine should be added.

VARNISH, Copal (New Preparation of.) — Dissolve one part of camphor in twelve parts of ether. When the camphor is completely dissolved, add four parts of colorless and finely-powdered copal. The copal to be carefully selected. Place this mixture in a bottle and shake until the copal is swollen and partly dissolved, then add four parts of proof alcohol and one quarter of a part of rectified spirits of turpentine; shake again sufficiently, and the varnish is ready for use. After the bottle has stood several days, however, the varnish divides into two distinct strata; the lower richer in copal, but the upper finer and perfectly colorless. Professor Boettger, the author of the formula, claims the superiority in transparency, elasticity, hardness, and durability for this varnish. The lower stratum may be again treated with camphor, etc.

VARNISH, Crystal. — Genuine pale Canada balsam and rectified oil of turpentine, equal parts; mix, place the bottle in warm water, agitate well, set it aside, in a moderately warm place, and in a week pour off the clear. Used for maps, prints, drawings, and other articles of paper, and also to prepare tracing paper, and to transfer engravings.

VARNISH, Fat Copal. — Take picked copal, 16 oz.; prepared linseed oil, or oil of poppies, 8 oz.; essence of turpentine, 16 oz.

Liquefy the copal in a matrass over a common fire, and then add the linseed oil, or oil of poppies, in a state of ebullition; when these matters are incorporated, take the matrass from the fire, stir the matter till the greatest heat is subsided, and then add the essence of turpentine warm. Strain the whole, while still warm, through a piece of linen, and put the varnish into a wide-mouthed bottle. Time contributes towards its clarification, and in this manner it acquires a better quality.

VARNISH, Flexible. — 1. India rubber in shavings 1 oz.; mineral naphtha 2 lbs.; digest at a gentle heat in a close vessel till dissolved, and strain. — 2. India rubber 1 oz.; drying oil 1 quart; dissolve by as little heat as possible, employing constant stirring, then strain. — 3. Linseed oil 1 gallon; dried white copperas and sugar of lead, of each 3 oz.; litharge 8 oz.; boil with constant agitation till it strings well, then cool slowly and decant the clear. If too thick, thin it with quick-drying linseed oil. The above are used for balloons, gas bags, etc.

VARNISH for Glass. — Pulverized gum tragacanth, white of egg, equal quantity. Stand till dissolved. Spread on the glass carefully with a brush.

VARNISH, Glaze. — Powdered sealing wax, $\frac{1}{2}$ ounce; alcohol, 95 per cent., 2 ounces. Keep in a bottle in a warm place till the wax is dissolved.

This varnish gives a beautiful glazed polish to paper, straw, leather, and the like.

VARNISH, Gold. — Pulverized gum copal, 1 ounce; oil lavender, 2 ounces; turpentine, 6 ounces. Put the oil in a pan on hot sand. When warm, add the turpentine and copal as in the camphor varnish.

VARNISH, Gold-colored Copal. — Take copal in powder, 1 oz.; essential oil of lavender, 2 oz.; essence of turpentine, 6 oz.

Put the essential oil of lavender into a matrass of a proper size, placed on a sand-bath heated gently. Add to the oil while very warm, and at several times, the copal powder, and stir the mixture with a stick of white wood rounded at the end. When the copal has entirely disappeared, add at three different times the essence almost in a state of ebullition, and keep continually stirring the mixture. When the solution is completed, the result will be a varnish of a gold color, exceedingly durable and brilliant.

VARNISH, Gum Elastic. — India rubber, cut fine, $\frac{1}{2}$ pound; linseed oil, $\frac{1}{2}$ pound; turpentine, $\frac{1}{2}$ pound. Add the gum to the oil while boiling. When dissolved, add the turpentine. Boil the whole till clear, and strain. Dries slow; if desired to dry quicker, use boiled oil. This varnish is brilliant, durable, and makes the cloth pliable.

VARNISH, Impermeable. — Boiled oil, 100 parts; finely powdered litharge, 6 parts; genuine bees'-wax, 5 parts. Boil until sufficiently thick and stringy, then pour off the clear.

VARNISH, India Rubber. — Digest India-rubber, cut into small pieces, in benzine for several days, frequently shaking the bottle containing the materials. A jelly will be formed, which will separate from the benzine; this dissolved in the fixed and volatile oils, dries fast, does not

crack or shine, unless mixed with some resinous substance.

VARNISH, Italian.—1. Boil Scio turpentine till brittle, powder, and dissolve in oil of turpentine.—2. Canada balsam and clear white rosin, of each 6 oz.; oil of turpentine 1 quart; dissolve. Used for prints, etc.

VARNISH, Japan.—Gum shellac, 2 pounds; oil, 1 gallon; red lead, 1 pound; litharge, 1 pound; umber, $\frac{1}{4}$ pound. Melt the gum in a small quantity of oil, and then add it, gradually, to the other oil while it is boiling. Boil the whole till stringy.

This is a good, strong driver, which gives to the paint a high gloss.

VARNISH, Lac.—1. Seedlac 3 oz.; turmeric 1 oz.; dragon's blood $\frac{1}{4}$ oz.; alcohol 1 pint; digest for a week, frequently shaking, decant and filter. Deep gold colored.

2. Ground turmeric 1 lb.; gamboge $1\frac{1}{2}$ oz.; gum sandarach $3\frac{1}{4}$ lbs.; shellac $\frac{3}{4}$ lb.; all in powder; rectified spirit of wine 2 gallons; dissolve, strain, and add turpentine varnish 1 pint. Gold colored.

3. Spanish annatto 3 lbs.; dragon's blood 1 lb.; gum sandarach $3\frac{1}{4}$ lbs.; rectified spirit 2 gallons; turpentine varnish 1 quart; dissolve and mix as the last. Red colored.

4. Gamboge cut small 1 oz.; Cape aloes cut small 3 oz.; pale shellac 1 lb.; rectified spirit 2 gallons; as the last. Pale brass colored.

5. Seedlac, dragon's blood, annatto, and gamboge, of each $\frac{1}{4}$ lb.; saffron 1 oz.; rectified spirit of wine 5 quarts; as last.

Lacquers are used upon polished metals and wood to impart the appearance of gold. As they are wanted of different depths and shades of color, it is best to keep a concentrated solution of each coloring ingredient ready, so that it may at any time be added to produce any desired tint.

VARNISH, Mastic.—Very pale and picked gum mastic, 5 lbs.; glass pounded as small as barley, and well washed and dried, $2\frac{1}{2}$ lbs.; rectified turpentine 2 gallons; put them into a clean 4 gallon stone or tin bottle, bung down securely, and keep rolling it backwards and forwards pretty smartly on a counter or any other solid place for at least 4 hours; when, if the gum is all dissolved, the varnish may be decanted, strained through muslin into another bottle, and allowed to settle. It should be kept for 6 or 9 months before use, as it thereby gets both tougher and clearer.

VARNISH, Mahogany.—Sorted gum anime 8 lbs.; clarified oil 3 gallons; litharge and powdered dried sugar of lead, of each $\frac{1}{4}$ lb.; boil till it strings well, then cool a little, thin with oil of turpentine $5\frac{1}{2}$ gallons, and strain.

VARNISH, Oak.—1. Clear pale rosin, $3\frac{1}{2}$ lbs.; oil of turpentine 1 gallon; dissolve.—2. Clear Venice turpentine 4 lbs.; oil of turpentine 5 lbs.; mix. Both are good common varnishes for wood or metal.

VARNISH, Oil.—Rosin 3 lbs.; melt, add Venice turpentine 2 lbs.; pale drying oil 1 gallon; cool a little and thin with oil of turpentine 1 quart.—2. Rosin 3 lbs.; drying oil $\frac{1}{2}$ gallon; melt and thin with oil of turpentine 2 quarts. Both the above are good varnishes for common work.

VARNISH, Seedlac.—Wash three ounces of seedlac in several waters, dry it, and powder it coarsely. Dissolve it in one pint of rectified spirits of wine, put it in a gentle heat, shaking

as often as convenient, until it appears dissolved, pour off the clear, and strain the remainder.

VARNISH, Shellac.—Gum shellac, $\frac{1}{4}$ pound; alcohol, 1 pint. Keep in a warm place till the gum is dissolved.

This makes a splendid polish for any fine article of furniture, guns, etc. It is best rubbed on with a cloth; moisten the cloth with the polish, and rub over the work briskly. It dries in a moment, and twenty coats may be put on in as many minutes. It is also a good (perhaps the best) thing for killing gnats, and is altogether a very useful article, and no paint-shop should be without it. Rough and weather-beaten signs, cloth, and such like may be coated with it, which will make the work hold up the color better. Dry paints may also be ground in it, for painting signs on cloth or paper. It holds the colors from flying, and will stand the weather.

VARNISH, Stone.—The method of coating wood with a varnish as hard as stone has been introduced into Germany. The ingredients are forty parts of chalk, forty of rosin, four of linseed oil, to be melted together in an iron pot. One part of native oxide of copper and one of sulphuric acid are then to be added, after which the composition is ready for use. It is applied hot to the wood with a brush, in the same way as paint, and as before observed becomes exceedingly hard on drying.

VARNISH, Tar. (For Wood or Iron.)—One gallon of coal tar, half a pint of spirits of turpentine, two ounces of oil of vitriol, stirred, and laid on like paint. Mix, with a piece of wood or stick, the tar and vitriol, and then add the turpentine, and apply with a brush. Mix no more than you can use at once, and then apply it as it becomes thick.

VARNISH, Turpentine.—Rosin, 5 pounds; turpentine, 1 gallon. Boil till the rosin is dissolved.

VARNISH, Water Proof.—An excellent water proof varnish, without alcohol, for various articles, is prepared by taking three parts, by weight, of pale shellac, one part of spirits of sal-ammoniac, and six or eight of water, and shaking them together in a bottle, and to be then corked up for twelve hours. This is then placed in an earthen vessel over a fire, and boiled, with constant stirring, till the shellac is dissolved. This solution replaces to great advantage the alcoholic solutions of shellac; and when mixed with about twelve parts of water, with the addition of terra de sienna or ochre, can be used in the preparation of oil cloths. After a little exposure to the air, the ammonia evaporates, and leaves a layer entirely impervious to, and unaltered by water. The same solutions may also be used in various combinations for staining wood of a brown color, and rendering it at the same time water proof.

VARNISH, White Copal.—White oxide of lead, ceruse, Spanish white, white clay. Such of these substances as are preferred ought to be carefully dried. Ceruse and clay obstinately retain a great deal of humidity, which would oppose their adhesion to drying oil or varnish. The cement then crumbles under the fingers, and does not assume a body.

VARNISH, White China.—There are two kinds of varnish used to produce the white gloss; one a solution of colorless resin in turpentine; the other in alcohol. For the first, pure copal

varnish is taken; for the second, 16 parts of sandarac are dissolved in sufficient strong alcohol, to which are added 3 parts of camphor; and lastly, when all dissolved by shaking, 5 parts of Venetian turpentine are added. Set for some days in the sun till clear. However, in order to cause the color to remain a pure white, care must be taken not to mix oil with the white paint put on previously. Best French zinc white is the best, mixed with turpentine; when dry, rub down with fine sand-paper, and put on another coat, and repeat this if required, and lastly put on the varnish described.

VARNISH, White Hard.—Gum mastic, 1 pound; gum anime, 4 ounces; gum sandarac, 5 ounces; alcohol, 95 per cent., 2 ounces. Add all together, put in a warm place, and shake often. When the gums are dissolved, strain through a lawn sieve.

VARNISH, To Polish.—Take 2 ounces of tripoli powdered, put it in an earthen pot, with water to cover it: then take a piece of white flannel, lay it over a piece of cork or rubber, and proceed to polish the varnish, always wetting it with the tripoli and water. It will be known when the process is finished by wiping a part of the work with a sponge, and observing whether there is a fair even gloss. When this is the case, take a bit of mutton suet and fine flour, and clean the work.

VIOLET-COLOR, To Make.—Violet is made indifferently with red and black, or red and blue; and to render it more splendid, with red, white and blue. To compose violet, therefore, applicable to varnish, take minium, or what is still better, vermilion, and grind it with the camphorated mastic varnish to which a fourth part of boiled oil and a little ceruse have been added; then add a little Prussian blue ground in oil. The proportions requisite for the degree of intensity to be given to the color will soon be found by experience. The white brightens the tint. The vermilion and Prussian blue, separated or mixed, give hard tones, which must be softened by an intermediate substance that modifies, to their advantage, the reflections of the light.

WALNUT, To Polish.—1. Take asphaltum, pulverize it, place it in a jar or bottle, pour in about twice its bulk of turpentine or benzole, put it in a warm place, and shake it from time to time. When dissolved, strain it, and apply to the wood with a clothes or stiff brush. If it should make too dark a stain, thin it with turpentine or benzole. This will dry in a few hours. If it is desired to bring out the grain still more, apply a mixture of boiled oil and turpentine; this is better than oil alone. Put no oil with the asphaltum mixture, as it will dry very slowly. When the oil is dry the wood can be polished with the following:—Shellac varnish, of the usual consistency, two parts; boiled oil, one part. Shake it well before using. Apply it to the wood by putting a few drops on a cloth and rubbing briskly on the wood for a few moments. This polish works well on old varnished furniture. — 2. Mix, with good whiting, such colors as will produce as near as possible the color of the wood to be filled. This mixture to be dry. Then give the wood a good coat of oil, and sprinkle the mixture over the work until it is pretty well covered; then with a soft rag or other soft substance, rub this in well. Wipe off all superfluous

material. Let dry thoroughly and varnish. This mode is far superior to sizing.

WATERPROOF PAINT.—Ochre, 96 parts; lamp-black, 16 parts; boiled oil to mix. Then add yellow soap, 2 parts, dissolved in water, 8 parts. Well mix, and apply two coats of this mixture with a paint-brush, at intervals of two or three days; lastly, give a finishing coat of varnish formed of lamp-black and boiled oil, well ground together. Sufficient boiled oil must be used to reduce the mixture to the consistence of a thick varnish.

WHITE PAINTS.—Nearly all whites have their base in the oxides and carbonates of different metals.—*White Lead* is a carbonate of lead, prepared by submitting common lead to the action of acetic acid, or vinegar, at a high temperature. It is poisonous, especially when combined with oils or fatty matter. The chief adulterations are barytes, whiting, and silicate of potash.—*Carbonate of Barytes* is less poisonous than lead; it is certainly not as valuable, and has very little body, though it is whiter, and when combined with lead in proper proportions, makes a very good white, and does not injure the lead for ordinary purposes. The sulphate of barytes is often used in the cheaper leads, but is an inferior article.—*Zinc White* is an oxide of zinc. It is a durable and beautiful white, besides being harmless. All the very best and finest work in the cities is now finished with zinc. It has less body than lead, but is vastly whiter and more durable, and does not, like lead, turn yellow when excluded from the light and air.—*China White* is lead that has been elutriated, or washed, thereby freeing it from all impurities.—*Whiting* is well known to all. It is a carbonate of lime. It is of no utility as a paint, as it will become spotted, and rubs off after the oil is evaporated. It is properly fit for putty, and various room washes.—*Pearl White* is generally used for the finer and more delicate branches of painting. It is a submuriate of bismuth.—*Kremlitz White* is a superior quality of lead. There is little in the market at present, as the extensive manufactories at Krems have been abandoned. All German leads are considered the best, as their ores contain less iron.—*Silver White* is also a lead prepared by elutriating. It is the best of the tube colors for general use.

WHITE LEAD, Clark's process of Making.—A chamber of 12 to 15 feet square is furnished with a vinegar trough, through which a pipe of about one-inch calibre passes; it connects at right angles with a large main of steam-pipe at one end, and is there commanded by a cock; the other end passes entirely through the trough and chamber, and there discharges the condensed steam. They are also each supplied with a gas distributing-box or trunk, which is about four inches square in the clear and about thirteen feet long. These are placed an inch or so above and over the vinegar troughs, having small holes at short intervals through their sides, and at one end are connected by means of a short pipe, to which a cock is also adapted, to a main gas-pipe which is furnished by means of a blowing apparatus with the requisite supply of atmospheric air and carbonic acid gas. The sides of the chambers have cleats secured to them for supporting the rod over which the sheets of lead are suspended for conversion to white lead.

A boiler of iron or copper is heated with an-

thracite coal, from which the steam and carbonic acid gas are obtained for heating and supplying the chambers. The doors of the chambers fit close, so that some pressure is produced in them during the process of conversion.

The vinegar in the troughs, the sheet-lead on the rods, and the cisterns being closed, fire is applied to the furnace of the boiler, the blowing apparatus is put in motion, and the process of making white lead has commenced. Moderate quantities of coal and vinegar, and the constant attention of one man, are necessary to continue it; and one thousand tons of lead may be operated on by this attention as well as one hundred. The largest sized chamber will contain about ten tons of the metallic sheets, and require supplies of vinegar twice each twenty-four hours. If the lead appear moist and pasty, the vinegar is withheld; and to these points, namely, the supply of the gases, and attention to the fires, the duty of the operative is confined. At first the vinegar was placed on the floor of the chambers and covered with a false floor, which was perforated at short intervals, so as to distribute the gases and acid vapor equally through them. In this way the sheets of lead became much more expeditiously converted to white lead, but its specific gravity was lessened, and it was less esteemed by the painters.

WHITE PAINT, Cheap.—A very good white paint may be made without lead or oil by the mixture of skimmed milk, lime and whiting. The casein of the milk unites with the lime, making a cement which holds the whiting in place, and a very durable coating is thus formed. The method of preparing it is very simple, as follows: Take five pounds of whiting, two quarts of skimmed milk and two ounces of fresh slacked lime; put the whiting in a stoneware vessel, and add a small portion of the milk with constant stirring. When a smooth thin paste is formed, add the remainder of the milk, then sprinkle the lime upon the surface and stir in. The paint is then ready for use unless the whiting and lime be not quite fine, when it may be necessary to grind the whole together. This paint possesses the advantage of being economical and durable, and will doubtless come into extensive use for many kinds of cheap work. Paris white may be used instead of whiting for superior work.

WHITEWASH.—1. A fine brilliant wash is obtained by mixing "Paris white" with glue, in the proportion of sixteen pounds to half a pound of glue. The glue should be the white, transparent kind. It should be covered with cold water at night, and in the morning carefully heated until dissolved. The Paris white should be stirred into hot water until it is of the proper milky consistency for applying to the walls, and the dissolved glue added and thoroughly mixed. This recipe is considered one of the best, and has the merit of being inexpensive.—2. The following is sent out by the Light-house Board of the Treasury Department: "The following recipe for whitewashing has been found by experience to answer on wood, brick, and stone, nearly as well as oil paint, and is much cheaper: Slack half a bushel of unslacked lime with boiling water, keeping it covered during the process. Strain it and add a peck of salt, dissolved in warm water; three pounds of ground rice put in boiling water, and boiled to a thin paste; half a pound of powdered Spanish whiting, and a pound of clear glue,

dissolved in warm water: mix this well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace, and when used put it on as hot as possible, with painters' or whitewash brushes."—3. Take a clean, water tight cask and put into it half a bushel of lime. Slack it by pouring water over it boiling hot, and in sufficient quantity to cover it five inches deep, and stir it briskly till thoroughly slackened. When the lime has been slackened, dissolve it in water, and add two pounds of sulphate of zinc and one of common salt. These will cause the wash to harden and prevent its cracking, which gives an unseemly appearance to the work. A beautiful cream color may be given to the wash by adding three pounds of yellow ochre; or a good pearl or lead color, by the addition of lamp or iron black. For fawn color add four pounds of umber, one pound of Indian red, and one pound of common black. For stone color add four pounds raw umber and two pounds lamp black. When applied to the outside of houses and to fences, it is rendered more durable by adding about a pint of sweet milk to a gallon of wash.

WHITEWASH, Stucco.—Take half a bushel of nice unslacked lime; slack it with boiling water, covering it during the process to keep in the steam. Strain the liquor through a fine sieve or strainer, and add to it one peck of clean salt, previously dissolved in warm water, three lbs. of ground rice, ground to a thin paste, and stirred and boiled hot; half a pound of powdered Spanish whiting, and one pound of clean glue, which has been previously dissolved by first soaking it well, and then hanging it over a small fire, in a small kettle within a large one filled with water. Add five gallons of hot water to the whole mixture; stir it well and let it stand a few days, covered from dirt. It should be put on quite hot; for this purpose it can be kept in a kettle on a portable furnace. It is said, that about one pint of the mixture will cover a square yard upon the outside of a house, if properly applied. Brushes more or less small may be used, according to the neatness of the job required. Coloring may be used to impart any desirable tinge to the preparation, which retains its brilliancy for a long time.

WHITEWASH, Improved.—The sulphate of baryta is said to possess numerous advantages over lime as a material for whitewashing walls. Four ounces of glue are soaked for twelve hours in tepid water, and then placed until it boils, in a tin vessel, with a quart of water—the vessel being placed in the water, as in the usual process of melting glue; the whole is then stirred until dissolved. Six or eight pounds of sulphate of baryta, reduced to an impalpable powder, is put into another vessel; hot water is added, and the whole stirred until it has the appearance of milk of lime. The sizing is then added, and the whole stirred well together, and applied in the ordinary way while still warm.

WHITEWASHED WALLS, To Paint.—If the cracks be in the plastering, and the wash be sound around the cracks, plaster of Paris is the best thing to fill them with, as it hardens quickly, does not shrink, and leaves the surface on a plane with the wall. If the plaster of Paris set before it can be worked, wet it with vinegar. The stronger the acid, the slower it will set. If cracks be filled with putty, and the wall be painted

in gloss color, the streaks of putty are very apt to be flat (no gloss), and if painted in flat color, the streaks are quite sure to have a gloss. These streaks, of course, will spoil the beauty of the work, but do not affect its durability. When filled with plaster of Paris the reversion of gloss never appears, if done as directed. If the cracks be only in the wash, the latter is loosening from the wall; and if it has not begun to scale, it soon will, and all attempts to fasten it on and paint it, will be total loss. If it be loose enough to scrape off, scrape the wall, taking care not to gouge into the original wall. If not loose enough, let it alone until it is. If the wash be thin, solid, and even, it can be painted to look and wear well. When the surface is lumpy, rub the lumps off with a sandstone, or a brick. After a wall has been prepared, as in either of above cases, or if a wall that has never been washed is to be painted, size it with two coats of glue size (3 ounces glue to one gallon water.) Be sure the glue is all dissolved before using any of it. Let the first coat dry before the second coat is put on. When the second coat is dry, paint as follows: Mix the first coat of paint in the proportion of 1 gallon raw linseed oil to 15 pounds white lead, ground in oil, and 1 gill of dryer. Second coat: 1 gallon raw linseed oil, 25 pounds white lead ground in oil, and $\frac{1}{2}$ gill dryer. (The lead should be the best.) Then finish either in gloss or flat color, the same as if it were wood work, with one good coat of priming on. Shade all the coats of paint, as near as you can, to the color you wish to finish in. Mix the third and fourth coats the same as the first, that is, about the same thickness for a gloss finish, and a little thinner for a flat finish.

WOOD, Composition for Coating.—A method of coating wood with a varnish as hard as stone has been recently introduced. The ingredients are forty parts of chalk, forty of resin, four of linseed oil, to be melted together in an iron pot. One part of native oxide of copper, and one of sulphuric acid, are then to be added, after which the composition is ready for use. It is applied hot to the wood, with a brush, in the same way as paint, and, as before observed, becomes exceedingly hard on drying.

WOOD, To Dye Red.—Take chopped Brazil wood, and boil it well in water, strain it through a cloth. Then give your wood two or three coats, till it is the shade wanted. If wanted a deep red, boil the wood in water impregnated with alum and quick-lime. When the last coat is dry, burnish it with the burnisher and then varnish.

WOOD, To Polish.—Take a piece of pumice-stone and water, and pass regularly over the work until the rising of the grain is cut down; then take powdered tripoli and boiled linseed oil, and polish the work to a bright surface.

YELLOW PAINTS.—Yellows have their bases in iron, lead, quicksilver, and arsenic. — *Chrome Yellow.* The best is made from chromium and acetate, or the nitrate of lead, and is properly a chromate of lead. An inferior article is prepared with whiting. The best now in use for general painting has its base in silicate of potash and barytes. — *Gamboge* is the concrete juice of various trees in Ceylon. It is a transparent color, and consequently useful as a glazing color. — *Yellow Ochre* is an earth. The best comes from France. — *Stone Ochre* is also an earth, found in many parts of Europe. — *Naples*

Yellow is an earth found near Naples, but most of that now in the market is composed of lead, alum, sal-ammonia, and antimony. It is a soft, bright, and durable color. — *Turner's Yellow*, a muriate of lead. This is a beautiful tint, and has formerly been much used among coach-painters.

ZINC PAINT, Preparation of.—A useful hint in regard to the preparation of paint with oxide of zinc instead of white lead will be found in the following instructions, published in a German journal: The ordinary boiled linseed-oil should be replaced in the mixing operation by one prepared by gently boiling two hundred pounds of the raw oil for five or six hours, then adding about twenty-four pounds of coarsely broken lumps of binocide of manganese, and continuing the boiling operation for about ten hours longer. In this manner a very quickly drying linseed-oil is obtained, which is eminently fit for the purpose of being used with zinc-white and other zinc colors. According to the writer of the article, much depends upon the use of old linseed-oil, and also upon the pains taken with the boiled oil, which, unless carefully kept from the contact of the air, becomes thick in a very short time. The boiled oil so prepared is not to be used alone in painting with zinc-white, but must be mixed with from three to five per cent. of raw linseed-oil while the paint is being mixed together.

ZINC-WATER PAINT.—The unpleasantness of occupying a newly painted house may, it is said, be avoided by the use of zinc-water paint. Powdered oxide of zinc (which may be heated with a little potato starch if more "body" be wanted) is combined with the desired mineral or vegetable color, and with this an aqueous solution of chloride of zinc, to which some tartrate of potassa has been added, is then mixed; the water paint thus formed being applied with a brush on the surface to be coated. In half an hour this paint will be perfectly dry; and the object of the alkaline tartrate is to make the drying process less rapid. The advantages of using the water paints are very numerous: they are more durable than oil paints, do not blacken by exposure to sulphurous vapors, are devoid of odor, dry quickly, resist dampness and the action of water, can be cleansed with boiling water and soap like oil paints, and preserve the wood to which they are applied from decay and render it less combustible. This latter property may be increased by the addition of borax. Both the oxide and the chloride of zinc can be manufactured without danger to the health of the workman, sold at a low price, and kept for any length of time in any climate.

ZINC, Painting.—A difficulty is often experienced in causing oil colors to adhere to sheet zinc. Boettger recommends the employment of a mordant, so to speak, of the following composition: One part of chloride of copper, one of nitrate of copper, and one of sal ammoniac, are to be dissolved in sixty-four parts of water, to which solution is to be added one part of commercial hydrochloric acid. The sheets of zinc are to be brushed over with this liquid, which gives them a deep black color; in the course of from twelve to twenty-four hours they become dry, and to their now dirty-gray surface a coat of any oil color will firmly adhere. Some sheets of zinc prepared in this way, and afterward painted,

have been found to entirely withstand all the atmospheric changes of winter and summer.

ZINC WHITEWASH.—Mix oxide of zinc with common size, and apply it with a white-

wash brush to the ceiling. After this, apply in the same manner a wash of the chloride of zinc, which will combine with the oxide to form a smooth cement with a shining surface

PHOTOGRAPHY AND THE FINE ARTS.

ALBERT'S NEW PROCESS of Photolithography.—In 300 parts of pure water, 150 parts of white of egg and 15 parts of gelatine are dissolved, with 8 parts of bichromate of potash. The solution is accelerated by gentle heat, then filtered, and carefully kept in the dark. With this solution one side of a heavy piece of plate-glass, or some other transparent material, is coated, and dried in a dark, warm room. This coat of albuminous material must be made very carefully, so that no irregularities present themselves either in the smoothing of surface or in the color. Then the dry surface is carefully covered with a heavy black cloth, and the free side of the glass is submitted to the action of daylight. The effect of exposure of from one and a half to two hours is to make the side of the coating toward the glass more insoluble than the other. A second coating, made without albumen, of 300 parts water, 50 parts gelatine, and 17 parts bichromate of potassa, is then applied; and this is again dried in a warm, dark room. This second coat is now exposed to daylight, under any negative, in the usual frame, for a sufficient length of time, which varies greatly for different negatives and the state of the atmosphere, as every photographer knows. Then the glass plate is removed from the frame, soaked for about fifteen minutes in water, and exposed to the air to become dry to a certain degree; it is then ready to be printed like a lithographic stone. The parts of the coating which have become insoluble by exposure to light have not attracted water. These are dry, and will take the printing-ink; while those parts which were protected by the details of the negative have remained soluble to a greater or less degree, have absorbed water, are therefore moist, and will not take the oily printing-ink. The plate is treated like a lithographic stone, alternately with water, or moisture applied in the usual manner, and with printing-ink applied by the printer's roller. From every plate thus prepared 500 to 1,000 impressions may be made. In order to prevent the breaking of the plate by pressure during printing, it is placed on an elastic bed, or strengthened below with a thick layer of plaster, cement, or other suitable material. To keep the paper clean around the plate, a thin metallic frame, with a hole equal to the size of the picture, is laid every time on the plate, the same after inking, as is often done in all other styles of printing.

ALBERTYPE PROCESS, Edwards' Improvement on.—An English artist, Mr. Ernest Edwards, has been improving upon the Albert process until he has succeeded in obtaining what he and others call the perfection of the art. This method, in its present manipulation, consists in coating evenly with wax the plate of glass, the

surface of which has been ground but not polished, and then pouring over it a sufficient quantity of a mixture of gelatine, bichromate of potash, and chrome alum, so as to form, when spread out and subsequently dried, a film of the thickness of a very thin card. The chrome alum is of great importance in preventing the subsequent solubility of the film, as it has the property of preventing the gelatine from again becoming liquid after it is set; and without the use of some such process it would be entirely impossible to carry on the work successfully. The usual proportion of bichromate of potash to the gelatine is about five per cent., although this varies for different applications.

After the glass has been coated it is maintained in a level position for a few minutes, until the film has set sufficiently to permit its being placed edgewise, and stored away in a suitable drying-room to dry—an operation which usually occupies about twenty-four hours. After this the film is removed from the glass, the operation being facilitated by the use of the substratum of wax. This constitutes one of the most important advances of the Edwards process over the Albert, for various reasons that it is not necessary here to adduce. The film is then to be subjected to the action of the negative, and treated as in the Albert process; after which it is to be attached to a plate of zinc, which is accomplished by a special manipulation and it is then ready to furnish impressions. These are obtained by treating as on lithographic stone, namely by sponging with water, removing the surplus, and then pressing over the surface of the plate a sheet of blotting-paper. The ink rollers are next passed over it, the ink adhering according to the action of the light. The advantage of using the zinc plates in printing instead of glass, as is found in the original Albert process, lies in the greater durability of the former, and the immunity from the danger of cracking. A very great pressure is necessary in this class of printing to bring out certain tints, and the glass plate, however thick, is apt to be fractured. It is stated that fifteen hundred uniformly good prints can be obtained from a single film; and if a larger edition than this be required it is a very easy matter to prepare a number of films at the same time, so as to have a sufficient supply for any purpose.

ALBUMEN, Substitute for.—A new substitute for albumen, under the name of lactarine has been announced. It is a white or slightly yellow powder, with the odor of casein. When subjected to ether, a small amount of saponaceous fat may be extracted from the mixture. The powder resists water, but is accessible to the influence of the alkalis, either caustic or carbonat-

ed. Treated with the proper proportion of either acetic or hydrochloric acid, a curd is precipitated, which is found to be soluble in excess of the acid. In use, it is dissolved in ammonia, and can be colored to any required shade.

BATH, TONING.—To $\frac{1}{2}$ gallon water add $\frac{1}{4}$ ounce solution of common washing soda saturated, or enough to make it feel slippery to the fingers, then add a suitable quantity of chloride of gold.

BATH, FIXING.—Water, $\frac{1}{2}$ gal., hyposulphite of soda, 12 ozs.

BATH, NEGATIVE.—Forty grains of silver to the ounce of water, iodize slightly with iodide of silver; slightly acidulate with nitric acid.

BATH, To Restore.—Add fresh silver it required. Boil down one half. Add as much water as necessary, filter, and it is ready for use.

BATHS, Sensitizing.—For positives: Pure re-crystallized nitrate of silver (437 gr.), 1 oz.; pure nitric acid, 3 minims; alcohol, 2 drs.; distilled water, 10 ozs.; iodide of potassium, 1 gr. Dissolve the nitrate of silver in 3 ozs. of the distilled water, add the iodide of potassium, shake and allow to settle; test for acidity with blue litmus paper, and, if present, neutralize carefully with a solution of carbonate of soda. When neutral, add the remaining 7 ozs. of distilled water, filter and add the alcohol and nitric acid, and the bath is ready for use.

For negatives: Pure re-crystallized nitrate of silver, 1 oz.; glacial acetic acid, 5 minims; alcohol, 3 drs.; iodide of potassium, 1 gr.; distilled water, 10 ozs. Dissolve the silver in 3 ozs., and treat precisely as for bath for positives, observing that it is to be acidified with glacial acetic acid in place of nitric acid.

These baths should be kept in a dark place, and always show an acid test. When out of order, boil for a few minutes, add one-tenth volume of distilled water and restore to the original strength by adding strong solution of crystallized nitrate of silver in distilled water, and acidifying with the proper acids.

BICHROMATISM.—This is an easy and cheap process, carried out as follows: Fasten a piece of stout transparent tracing paper by gumming the four corners to a piece of strong cardboard, or a piece of thick, flat, level glass on which the design on thin paper has been pasted. If you cannot draw or get a friend to draw for you, many good and effective subjects may be found among old prints and woodcuts, and by taking a careful tracing of the necessary parts, a very good design and skillful bit of drawing obtained. When the design is satisfactorily penciled out on the tracing paper it must be gone over with a quill pen and thick tickler writer's ink; when dry, turn it, fasten down, and go over the other side. About one pennyworth of bichromate of potassa is to be coarsely pounded and put into about two ounces of hot water; strain this when cold, and then brush over one side of any pieces of paper or silk that it may be desired to print upon when they are dry. The printing is done by the usual photo paper printing frame, substituting the design on tracing paper for the glass negative. They print quick and deep if exposed to direct sunlight; one or more trials will easily give the right amount of time, and fixing is done by washing and soaking for a short time in clean water, next the drying and pressing with a

warm flat iron. Pure white centers may be left in any kind of border by stopping out in the printing with a piece of thin card or blackened paper. Ornamental devices or ornaments can be printed on pieces of white silk or ribbon by marking out a pattern and laying on the bichromate solution with a camel hair brush inside the pattern; when dry, iron slightly, in order that the ribbon may lie flat on the tracing pattern. Some highly effective ornamentation may be produced in this way. White centers may be left on ribbon and paper, and mottoes, verses, etc., printed with type. Pleasing and artistic blendings of type printing and ornament may be produced by such means with a very small outlay of time or money.

CAMERA, To Adjust for Chemical Focus.—Take a photograph of a printed sheet with the full aperture of the portrait lens, the central letters being carefully focused as before. Then examine at what part of the plate the greatest amount of distinctness of outline is to be found. It will, sometimes, happen that whereas the exact center was focused visually, the letters on a spot midway between the center and edge are the sharpest in the photograph. In that case the chemical focus is longer than the other, and by a distance equivalent to, but in the opposite direction of, the space through which the lens has to be moved in order to define those particulars sharply to the eye.

CAMEO-MÉDALLION CARTE-DE-VISITE, To Make.—The apparatus necessary for the production of cameo-medallion cartes is very simple, and comprised in the following articles:

A four-footed metal water bath, capable of being heated by means of a spirit-lamp, into which a square porcelain dish is placed, whose overlapping sides fit over those of the water bath. This dish, which is furnished with a lip, is employed to maintain the gelatin fluid at a high temperature.

The stamp, consisting of two square wood blocks connected together with hinges; between the blocks is fixed a brass plate also upon hinges, having in the middle an oval opening large enough to contain a bust portrait. The wood blocks open in the manner of an album, in which the brass plate, as it were, takes the place of the carte, and are, on the outside, perfectly smooth. On the inside of one of the blocks is an oval, in relief, of the exact dimensions of the opening in the metal plate; and on the other block is a corresponding hollow of oval form.

A press which can be tightly closed by means of screws. A linen or bookbinders' press will answer the purpose well, if such can be obtained, but I have myself constructed a small wooden press expressly for the process, which answers exceedingly well.

The above is all the apparatus necessary for the production of these portraits. In the first place, some pattern ovals are cut out of thick black paper, using the oval opening in the brass plate and a sharp penknife for the purpose, the cutting operation being effected at one sweep. In this way are obtained masks and small oval mats, which fit precisely into one another, and are, moreover, identical in size with the opening in the metal plate, and the relief and intaglio in the wood blocks. A print from a portrait negative, with graduated background, is then taken out of the pressure-frame, and over it is placed

one of the masks, in a position most favorable to the picture; and when the same has thus been centered, the oval mat corresponding to the mask is placed upon the print, and the mask withdrawn. The print is then exposed to the sun under a glass plate, the middle being still covered with the black mat, which must not be allowed to shift from its place, and thus a darkly-tinted, or even black, margin is printed around the oval picture. The print, in this condition, is then toned, fixed and washed, and finally sized in gelatin. The latter operation is performed by the aid of some glass plates of the required size, which are carefully cleaned, as if to serve for negatives, and then rubbed over with finely-powdered stone alum (luff stone) by means of a tuft of cotton wool, the superfluous powder being afterwards removed with a soft dusting brush. These plates are coated with a four per cent, normal collodion, and placed to dry in a spot free from dust. When perfectly dry, a quantity of gelatin is dissolved in hot water in a beaker, the solution being of the consistence of the collodion previously employed. This is filtered through a piece of linen into the porcelain bath, which has, in the interim, been warmed by means of the water bath, and should be maintained at an even temperature during the whole period of working.

The prints required to be gelatined are, in the first instance, trimmed to the right size by means of a cutting glass, and are then immersed bodily into the gelatin solution, so as to be fully impregnated with the same. The glass plates coated with collodion are now taken in hand; the prints laid face downwards thereon, care being taken that all air bubbles between the paper and glass are carefully pressed out and removed; afterwards a sheet of stout white paper, somewhat bigger than the print, is cemented to the back of each photograph, a precaution for protecting the pictures in the event of their spontaneously leaving the glass on drying.

The plates are allowed to remain for ten or twelve hours (say over night) in a dry locality, and, at the end of that time, the portraits may be separated from the glass by making an incision of the film all round the paper. The superfluous paper should be trimmed off previously to the pictures being mounted upon cardboard.

After drying, the carte is put through a steel press, and is then placed in the embossing stamp to give it the desired relief.

Many of the manipulations may be slightly modified if desired. For instance, instead of cementing a piece of paper to the back of the prints, the card itself, if not very thick, may be at once attached, and the margins thereof thus gelatined, the process of rolling being in this way obviated. Some photographers add a small quantity of sugar candy to the gelatin, in order to prevent the sizing solution drying too rapidly, and to render the finished card more plastic and impressionable.

CANVAS, To Prepare for OIL PAINTING.

—Stretch your canvas on a board with tacks and paint it simply with white lead and raw linseed-oil; put it on thin, evenly, and smoothly; if you do not want a white ground to paint on, you may mix in very little ochre, which makes it yellowish, or a trace of lamp-black, which gives a bluish gray. When dry and not smooth enough, you may rub it down with pumice-stone and water, and give it a second very fine and thin

coat. This, however, is seldom necessary. Then stretch on your frame. We warn you against other recipes, and above all against the advice of using glue first to fill the pores of the canvas; your painting will, in this case, be in great danger to eventually peel off in patches by exposure to dampness, or even by damp weather only. The pores of the canvas must be filled with oil, which is water-proof, and not with glue. The latter is only good for economy, to save a little oil. We have always followed this simple advice given here, and have never had any cause to abandon it.

CRAYONS, To Make.—Take three quarters of a pound of blue clay, three quarters of a pound of the coloring required, such as vermilion, chrome, Prussian blue, orpiment, etc., 2 ounces of turpentine, 4 ounces of spirits of wine, and 6 ounces of fine shellac. The clay must be well mixed with water, passed through a fine lawn sieve, and allowed to subside; the water is then poured off and the clay dried. The shellac must be dissolved in the mixed turpentine and spirit with a little warmth. The dry clay and the coloring, must be blended in a mortar, and then the shellac mixture added and well incorporated till the whole is a doughy mass; it is then to be rolled out into a pencil form and dried with stove heat. To make the crayons of uniform substance, the paste may be placed in a cylinder, with a hole at one end and a piston at the other (like a boy's popgun), the "wormy" pieces that pass through are then cut into proper lengths and dried.

COLLODION PROCESS.—This process is one that generally gives more pleasure to the amateur and his friends than any other. The first thing requisite is gun cotton: to make which, proceed as follows:—Take half an ounce of dry nitrate of potass (saltpetre), and three quarters of an ounce of strong sulphuric acid (oil of vitriol); mix in a glass or porcelain cup; then add thirty grains of dry cotton wool, and stir the whole up with a glass rod for about five minutes; remove the cotton, and wash it well in four or five waters, (common water will do); when well washed, dry it carefully. You thus obtain gun cotton. About ten grains of this is dissolved in about three ounces of sulphuric ether, to which is added about sixty drops of alcohol. This solution is called collodion.

When collodion is poured on a clean plate of glass, it almost instantly hardens into a beautiful transparent and very tenacious film; and, taking advantage of this property, we incorporate with it a certain amount of a sensitive salt of silver, which, on being exposed in the camera in the same manner as paper, produces a most beautiful picture in a space of time varying from the fraction of a second up to ten or fifteen seconds; and this is generally accompanied with the most perfect detail of all the parts.

There are several formulas for the preparation of this useful substance; but we shall only give one, as more would confuse the amateur, and we have always found the following very certain:—Dissolve twenty grains of gun cotton in six ounces of ether, to which add three quarters of an ounce of alcohol. If the cotton does not entirely dissolve, allow it to remain for a short time, and pour the clean part off for use. Keep this solution in a bottle, and call it 1. To one ounce of alcohol (spirits of wine), add as much

iodide of ammonium as it will dissolve; then add as much iodide of silver (made from the nitrate of silver and iodide of potassium), as the solution will take up; keep this in another bottle, and call it 2. Procure another bottle with a wide mouth, and pour into it one ounce of collodion out of 1; to which add 15 or 20 drops from 2. The collodion thus formed is called collodio-iodide of silver.

Having well washed and cleaned a plate of glass, of the same size as the frame in your camera, coat it on one side evenly, and without hurry, by passing the collodion on the center from the bottle; pour back any excess of liquid from one corner, and then draw the mouth of the bottle along the under edge of the glass, until you come to the other corner of the plate. In this way you cause the collodion to cover the plate in an even manner.

To excite the plate thus loaded with collodion for the camera, proceed as follows:—In a trough or bath made of gutta percha, glass, or porcelain, large enough to hold the plate, make a mixture in the following proportions: distilled water, 1 oz.; nitrate of silver, 20 grains; alcohol, 30 drops; dissolve and filter, (if the bath contain six or eight ounces you of course increase the quantity of each six or eight times;) you then carefully and quickly plunge the coated plate of glass into the bath, and after lifting it up and down two or three times, allow it to remain covered by the solution for about two minutes.

To do this neatly, get a strip of glass two or three inches longer than the plate, and about two inches wide; cut off about a quarter of an inch from one end and cement it on the front of the end from which you took it; you thus obtain a dipper on which the plate rests, and by holding the other end of the plate, it can be easily plunged in the bath. You then place the plate in the frame, and the frame in the camera, (having previously obtained a good focus;) and by pulling out the slide in front of the plate, you expose for a space of time varying from one to fifteen seconds. We cannot give any rule for the exact length of time, as it depends on the color of the object, the amount of light shining on it, the quality of that light, and the amount of light which the object reflects, etc., a knowledge of all which must be obtained by practice.

Having closed your slide, you carry the frame into the dark room, and, taking out the plate, develop the picture in the following manner:—Make a solution consisting of distilled water, 4 ozs.; pyrogallie acid, 5 grains; strongest acetic acid, 60 minims; dissolve and filter. In applying this solution, hold the plate perfectly level, the collodion side upwards, and pour enough of it on the plate to cover it; in a very short time the picture will be developed. Wash it with water, and pour over it some of the solution of hyposulphate of soda, made thus: water, 1 pint, hyposulphate of soda, 4 ozs. Allow it to remain one or two minutes; and after thoroughly washing it all off again, your "negative" collodion picture is finished.

COLLODION, Photographic.—Pure alcohol, 10 ozs.; pure ether, 20 ozs.; prepared cotton, 300 grs. Pour the alcohol into a 40 oz. glass bottle, add the cotton, and shake until the cotton is thoroughly wetted; then add the ether, shake well and set away in a cool, dark place for several weeks to settle. In very warm weather in-

crease the proportion of alcohol by addition a day before use or at time of iodizing.

COLLODION, To Iodize.—Plain collodion, 3 ozs.; iodizing solution, 1 oz. Mix and set away in a dark, cool place 12 hours before using.

Any of the ordinary iodides or bromides can be substituted in the above formula.

COLLODIO-ALBUMEN PROCESS, Taupenot's.—*Cleaning the Glasses.* This part of the process must be conducted with care.—*Sensitizing and Washing.* Employ 2 nitrate baths in this process, one for the collodion and the other for the second film, viz., the albumen. The albumen nitrate bath must contain free acetic acid, and therefore if one solution be employed for both films it should be a bath of aceto-nitrate. Sensitize the collodion in the ordinary way, holding it rather longer than usual before dipping. Having arranged 2 dishes of common water, side by side, lay the plate face uppermost in the first dish, and wave the water backwards and forwards for about 30 seconds. Then put the plate into the second dish and leave it whilst another glass is being coated and immersed in the sensitizing bath. Now drain plate No. 1 closely on blotting-paper, and it will be ready for the iodized albumen. Plate No. 2 remains in the sensitizing bath until the first glass has been coated with albumen and placed to dry.—*Preparation of the Iodized Albumen.* Take of albumen, 3 ozs.; distilled water, 1 oz.; strong ammonia, 10 minims; iodide of potassium, 10 grs.; bromide of ammonium, 10 grs. First mix the ammonia and the water, then add the other ingredients and shake together in a bottle. Iodide of ammonium may be advantageously used.—*To Apply the Albumen.* For a stereoscopic size, measure out 1 dr. of the albumen and pour it on and off twice to displace the surface water of the washed collodion film. Then apply a second quantity. Stand the albuminized plates vertically on blotting-paper to drain and dry.—*The Aceto-nitrate Bath.* Take an ordinary collodion negative bath and add to each fluid ounce 30 minims of glacial acetic acid, keep it in glass or gutta percha and continue to use it until it has become blackened by the action of the albumen. The film of albumen must be rendered quite dry by holding it to the fire before it is dipped in the aceto-nitrate bath. Leave them in the bath any time between 30 seconds and 2 minutes, and then remove the wash with water. Use two dishes for washing and allow 20 or 30 seconds in each dish; then rear up again to dry, and the plates will be ready for exposure. Artificial heat may be used with advantage. The most successful operators in Taupenot's process give a very long exposure.—*Development.* Prepare a saturated solution of gallic acid in distilled water, adding 4 grs. to each oz. Filter this developer through paper. The solution of nitrate of silver for use with the gallic acid may be made of the strength of 20 grs. to the ounce. Add 15 minims to 1 oz. of gallic acid solution. Previous to the application of the developer the surface of the film must be moistened with water. From half an hour to an hour must be allowed for the full development with gallic acid. Fix with a saturated solution of hyposulphite.

DEVELOPERS.—For positives: 1. Pure sulphate of iron, 150 grs.; glacial acetic acid, 6 fl. drs.; water, 10 ozs.; nitric acid, 2 minims. Dis-

solve the sulphate of iron in the water, and add the acetic and nitric acid and cork tightly.

2. Sulphate of iron, 480 grs.; nitrate of baryta, 320 grs.; alcohol, 1 oz.; nitric acid, 30 minims; water, 10 ozs. Powder the nitrate of baryta and dissolve in the water warmed; when dissolved, add the powdered sulphate of iron, stirring for a few minutes; filter, and when the liquid becomes cold, add the nitric acid and alcohol separately. Bottle and cork tightly.

For negatives; 1. Pyrogallie acid, 10 grs.; glacial acetic acid, 3 drs.; distilled water, 10 ozs. Dissolve the pyrogallie acid in the water, add the glacial acetic acid, cork tightly.

2. Sulphate of iron and ammonium, 2 ozs., or sulphate of iron, $1\frac{1}{2}$ oz.; glacial acetic acid, $\frac{1}{2}$ oz., or acetic acid No. 8, $1\frac{1}{2}$ oz.; alcohol, $\frac{1}{2}$ oz.; distilled water, 10 ozs. Add to the distilled water in the order indicated, the iron-salt to be first dissolved. In warm weather this developer requires dilution, and must be washed from the plate the instant the details appear.

DEVELOPER, Pyrogallie Acid.—Forty grs. of pyrogallie acid being dissolved in 1 oz. of glacial acetic acid, and 20 minims added to 1 oz. of water when required for use. The strong solution becomes black from decomposition in the course of a few weeks, but when diluted it has only a faint yellow tint, and is tolerably effective in bringing out the image. In place of acetic acid strong alcohol may be used as a solvent, $\frac{1}{2}$ a dr. of pyrogallie acid being dissolved in 1 oz. of spirit, and 20 minims of the resulting liquid added to each oz. of acidified water. No attempt must be made, however, to combine acetic acid and spirit in one solution, since abundance of acetic ether would be generated by so doing. These plans of preparing a concentrated developer are useful for a few weeks' keeping, but are not recommended for an unlimited time.

DEVELOPER, Concentrated Iron.—Mr. Edwards has found that the addition of a small quantity of copper to the iron developer hastens action, secures immunity from fogging, and brings out the finest details without impairing the contrast of shadows. He prepares a stock solution as follows: Protosulphate of iron, 1 pound; double salt of iron and ammonia, 1 pound; sulphate of copper, 1 ounce; water, 40 ounces, or enough to make a saturated solution. When required for use, take one ounce of the stock solution, dilute with 16 ounces of water, and add an ounce each of acetic acid and alcohol, but their proportions may be varied to suit the requirements of temperature and the special class of work.

There are advantages in having a stock bottle ready to be diluted and mixed when about to be used, and for the tourist who employs the wet process, it is an invaluable method of working, as it is very portable, and can be modified by the addition of one or another solution, to suit the character of the work. A little nitrate of silver solution can be used as an intensifier, if required.

DRAWING, Crayon.—Drawing in crayon will be found much more convenient than in oil or water colors, as you are spared the delay of waiting for them to dry. Crayon materials or pastels are put up in boxes of necessary tints for portraits or landscapes, and, by blending, every shade and color can be obtained as in oil painting. The pupil can purchase prepared paper or

board. A good paper for portraiture is pumice paper. Your sketch should be made as in penciling, and then proceed to the shading. For a head, we consider the drapery and groundwork—and here allow me to advise all to study penciling before attempting crayons: also, to begin by painting easy things.

The picture being drawn, proceed to fill in the background. Let the tints be varied, if in a colored crayon, according to the ideal or originals from which you are designing it. For example, if the lights in your picture are on the right side, the darkest shade in the groundwork must be placed on the right, and vice versa. See that the background be smooth, the dark shades of rich brown or green, and the light of gray, French blue, etc. Then—

1. Paint the dark shades with black crayon, and rub it in with a soft cork. The cork pencils ready prepared are best for that purpose, or rubbers of soft leather will answer.

2. Put in the light clear shades as they belong with the soft and medium crayons, using care in blending to avoid a dingy and dirty appearance.

3. Lay on the brown and other colors. When it is necessary to put brown over black, do not rub the two together; use your finger, as well as the cork.

4. In finishing the picture use hard crayon, laying on in lines, and blend with cork.

Having a variety of colors for other styles of painting, you can use your judgment in selecting from your boxes. You must have a box of soft and a box of hard crayons to obtain what you need. Try your colors first on a piece of waste paper.

Do not expect it will be right by laying on colors, once. You must work line over line many times and carefully. Do not soil your picture in the delicate parts. In addition to your colors in boxes, furnish yourself with black and white crayons of different tones, and a supply of dry carmine. We prefer the lump to the pencil. French blue is much used to produce clear lights. The paper must be some available tint, as its color appears through almost all portions of the work. A low-toned olive tint has been found very desirable. Have your paper an inch or two longer than the proposed picture; sketch the design lightly with black crayon No. 1, making sky and broad tints with the flat surface of broken pieces of crayon (1 and 2) rubbed in with the finger. The breadths of the nearer and remote distances are put in with broken pieces, blended together. Mountains, trees, etc., are drawn in with black crayon, then tinted and glazed with colored crayon.

DRAWING (Crayon), Mode of Fixing by steam.—Get a tin vessel with a tight-fitting lid, and a pipe projecting from the side, having a head perforated with holes. Into this vessel put two ounces of the strongest alcohol and two drachms of powdered sugar-candy. Boil it over a spirit lamp. Direct the steam to the back of your picture, until the papers and colors are perfectly saturated.

DRAWINGS, (Pencil) To Preserve.—1. Best alcohol, two ounces; camphor, four grains; after dissolved, to be applied, if on ordinary drawing paper, to the back; if on Bristol boards, coat it rapidly on the drawing side; then hang up to dry.

—2. Wash over the penciled surface very care-

fully with milk, from which the entire fatty parts or cream has been removed, and dry in the open air on blotting-paper. Water in which has been dissolved a little isinglass will answer the same purpose. — 3. Prepare a solution in moderate strength of bleached shellac in alcohol, wash over the back of the sheet of paper with this, and the drawing on the front will become fixed. In this way, as will be understood, there is no risk of smearing the lines of the drawing.

DRAWINGS, Simple method of Copying.—Silvered albumen paper, after being washed, may be conveniently used for copying negatives as well as positives. It keeps for weeks, and becomes sensitive to light only after exposure to the vapors of aqua ammonia, technically termed "smoking with ammonia." Dr. H. Vogel has greatly simplified the latter process by substituting for the liquid ammonia the powder of carbonate of ammonia. He thoroughly impregnates a piece of felt or cloth with this powder, and lays it under the silvered sheet, separated from it by a piece of blotting-paper. The negative is placed on the top, and the back covered, and the whole is ready for the copying frame. One impregnation with the carbonate of ammonia serves for several copies. So very simple is the operation that Dr. Vogel has made use of it in public libraries for copying complicated drawings. He places the silvered paper, with the substratum of carbonate of ammonia and the drawing on top, between two plates of glass, and, exposing it to the light of the window, obtains a copy quite distinct in all its details, while he himself may be occupied with reading or otherwise. The copy obtained is, of course, in white lines upon black ground. Such photographs merely require to be treated with soda when intended for long preservation. They are generally, however, not designed to be kept a great while.

ENGRAVING by PHOTOGRAPHY.—The photographic picture is taken upon sensitized glass, just as in the ordinary carte-de-visite, producing a negative from which any number of positives may be taken. The picture may be a portrait, a landscape, a group of sculpture, an architectural facade, or what not—anything, provided it assumes the form of a glass negative. The positives obtained from this are not upon sensitized paper, but upon a thin film of gelatine, combined with bichromate of ammonia. When light has been allowed to pass for a sufficient length of time through the negative to the positive, it shows its action in a peculiar way on the film: wherever the light is the strongest (as in the high lights of the picture), the film is rendered insoluble; wherever it is the weakest (as in the shadows), the film remains easily soluble; wherever it is intermediate (as in the half tints), the gelatine becomes partially soluble. It is the bichromate of ammonia that renders the gelatine susceptible to these peculiar varieties of effect. We may add that the electric light now furnishes a wonderful aid in taking the positive, rendering the photographer independent of times and seasons, day and night, bright days and dull days.

We have, then, a positive picture, taken upon a film of gelatine containing bichromate of ammonia. This film being next placed in warm water, the substance dissolves away in the unequal degree just intimated; it becomes thinner in the parts least acted on by the light; the parts

most acted on are scarcely dissolved at all; while the medium degrees of action produce medium degrees of dissolving or thinning. What is the total result? The film has become a sort of bas-relief; there is a picture of raised parts and depressed parts, owing to variations in the thickness of the film; and these variations are so beautifully graduated as to produce all the tints and half tints from high lights to deep shadows.

The pressure, which next ensues, is not the least curious part of the operation. It seems scarcely conceivable that a thin film of gelatine will act as a mold to impress its inequalities upon a plate of metal; yet such it certainly does. A beautifully smooth metal sheet is prepared, consisting of lead alloyed with a little antimony; the alloy is nearly (but not quite) the same as stereotype metal; it has a nicely determined degree of hardness (or softness, whichever we like to call it), settled after a number of experimental trials. The gelatine film is placed upon the lead plate, and the two between two steel plates, the group is placed in a hydraulic press, where an intense pressure is brought to bear upon it. This pressure amounts to as much as forty tons, even for a small picture, and rises to two hundred tons (nearly half a million pounds) when the dimensions are large. We might suppose that this overwhelming force would crush the delicate film into undistinguishable fragments. Nothing of the kind. The protuberances or raised parts press themselves bodily into the surface of the lead, producing a sunken or intaglio effect in all the places where the film presents a raised or cameo effect, and vice versa. It is wonderful to see how perfect is this action upon the plate, the picture appearing almost as if the graver had produced it. And it is scarcely less wonderful that the thin film of gelatine will bear twenty or thirty of these pressures, transferring its picture to twenty or thirty plates before being worn out.

Lastly comes the printing. If the lead plate were inked in the ordinary way with inking-rollers, and passed through an ordinary printing-press, the print obtained would consist simply of masses of black and white, without any gradations or half tints whatever; this would result naturally from the peculiar mode in which the plate is prepared. An ink or color, however, is got ready, consisting of water and gelatine mixed with some kind of pigment or paint. This ink, instead of being lightly applied by means of a roller, is poured as a liquid all over the plate; a sheet of paper is placed upon it; a light pressure is applied, sufficient to squeeze out all the superfluous ink; and the paper is allowed thus to remain until the gelatine in the ink has "set," or slightly solidified. The print, when removed, is dipped in a fixing bath, which renders the ink permanent.

ENGRAVINGS, Cleaning and Preservation of.—In commencing to restore an engraving, some attention must be given to the kind of injury it has suffered. A general brown color more or less deep, resulting from atmospheric action only, is the least possible change. Spots and stains, caused by ink, colored fluids, oil or insects, must be first treated, and all pencil marks removed by India-rubber or bread crumbs. A fluid acid, obtained by dissolving 1 oz. of crystals of oxalic acid in $\frac{1}{4}$ pt. of warm water, may be used for application to all stains, and the paper should be

wet with it thoroughly where spots of any kind exist.

Excepting in a few cases, this acid will not cause the removal of stains immediately, but generally it combines with the bases of them, and they are removed by subsequent steps; the thorough wetting should be done a few hours before proceeding to clean the engraving. The engraving should be placed in a shallow tub or other vessel, and allowed to rest upon a piece of open cotton stuff, or millinet. This material of suitable dimensions, should have 2 rods or sticks sewn to opposite edges. These sticks will hang over the sides of the vessel, and permit the prints to be withdrawn or moved without any risk of injury, and they should remain in soak with warm or cold water for 12 or 24 hours. When the prints no longer discolour the water on being agitated, the fluid should be withdrawn, and enough clean water added to cover them. Half a pound of chloride of lime should be made into a paste with cold water, and stirred up with 2 qts. of water, and allowed to settle for 6 hours. Part of the clear solution should be added to the bath till the smell of chlorine is perceived, and the prints should be moved to facilitate the action. In very bad cases, 1 oz. of muriatic acid mixed with a pint of water may be added, and when the bleaching is effected the prints should be well washed with fresh water and slowly dried.

ETCHING.—A method of engraving on plates with acids, which are poured into lines drawn on the plate, covered with a wax ground. The plate is warmed, the ground is applied, and distributed evenly by heat, and when cool, a bodkin, etc., is used to engrave, by removing the wax, so as to expose the plate in lines suited to the sketch. The acid is then applied to bite away the exposed portion of the plate; it is prevented from acting elsewhere by the untouched wax, and when it has acted sufficiently the wax is removed and the sketch printed from.—*Etching Ground.*—Melt in a glazed earthen vessel 2 oz. of powdered asphaltum, then add 1 oz. of Burgundy pitch; melt, and add 1½ oz. of virgin wax; mix well, pour into warm water and incorporate the whole with the hands.—*Transparent Etching Ground.*—Resin, 1 oz., virgin wax, 2 oz.; melt in an earthen pipkin. Or turpentine varnish mixed with a small quantity of oxide of bismuth.

—*Bordering Wax.*—Burgundy pitch, 3 lbs., bees'-wax, 1 lb.; melt, and add ½ pint of sweet oil. Pour it into water and work it with the hands.—*Etching Fluid for Copper.*—1. Nitrous acid, 1 part, water, 5 parts; mix gradually, and add the size of a hazel nut of sal ammoniac to each pint.—2. Verdigris, alum, sea salt, and sal ammoniac, of each 1 part, vinegar, 2 parts; dissolve, add water, 4 parts, boil a minute, and cool.—3. Iodine, 2 parts, iodide of potassium, 5 parts, water, 8 parts.—*Etching Fluid for Steel.*—1. Pyroligneous acid and nitric acid, each 1 part, water, 6 parts.—2. Iodine, 1 oz., iron filings, ½ drachm, water, 4 oz.; digest until dissolved.—3. Hydrochloric acid, 10 parts, distilled water, 70 parts, chlorate of potash, 2 parts. Dissolve the chlorate in the water, and add the acid. Diluted with water for use to the strength required.

FADED PHOTOGRAPHS, To Reproduce.

—The pictures are, in the first place, thoroughly impregnated with wax, care being taken to remove all excess by hot ironing, subsequently rubbing the surface with a tuft of cotton. This

operation itself deepens the contrasts of the picture, and brings out many minor details previously invisible, the yellowish-whites being rendered more transparent, while the half tones and shadows retain their brown, opaque character. This picture, thus prepared, is then used as a negative, and employed for printing in the usual way.

GLASS, Cleaning for a Photograph.—Immerse for several hours in a strong solution of common washing soda, rinse, and rub with alcohol and Joseph paper. Kurz varies from this a little. After the soda bath, he puts the glass into a nitric acid and water, equal parts, for 2 hours. Then wash under tap, and rub with a sponge, rinse, and coat with filtered albumen (white of one egg to 24 ounces of water, well beaten).

GLASS, To Etch upon.—Procure several thick, clear pieces of crown glass, and immerse them in melted wax, so that each may receive a complete coating, or pour over them a solution of wax in benzene. When perfectly cold draw on them, with a fine steel point, flowers, trees, houses, portraits, etc. Whatever parts of the drawing are intended to be corroded with the acid should be perfectly free from the least particle of wax. When all these drawings are finished the pieces of glass must be immersed one by one in a square leaden box or receiver, where they are to be submitted to the action of hydrofluoric acid gas, made by acting on powdered fluor-spar by concentrated sulphuric acid.

When the glasses are sufficiently corroded they are to be taken out, and the wax is to be removed by first dipping them in warm and then in hot water, or by washing with turpentine or benzene. Various colors may be applied to the corroded parts of the glass, whereby a very fine painting may be executed. In the same manner sentences and initials of names may be etched on wine-glasses, tumblers, etc.

LEAF, To take Impressions of.—Hold oiled paper in the smoke of a lamp or of pitch, until it becomes coated with the smoke; to this paper apply the leaf of which you wish an impression, having previously warmed it between your hands, that it may be pliable. Place the lower surface of the leaf upon the blackened surface of the oil paper, that the numerous veins that are so prominent on this side may receive from the paper a portion of the smoke. Lay a paper over the leaf, and then press it gently upon the smoked paper, with the fingers or with a small roller (covered with woolen cloth, or some like soft material), so that every part of the leaf may come in contact with the sooted oil-paper. A coating of the smoke will adhere to the leaf. Then remove the leaf carefully, and place the blackened surface on a sheet of white paper, not ruled, or in a book prepared for the purpose, covering the leaf with a clean slip of paper, and pressing upon it with the fingers, or roller, as before. Thus may be obtained the impression of a leaf, showing the perfect outlines, together with an accurate exhibition of the veins which extend in every direction through it, more correctly than the finest drawing. And this process is so simple, and the materials so easily obtained, that any person, with a little practice to enable him to apply the right quantity of smoke to the oil-paper, and give the leaf a proper pressure, can prepare beautiful leaf impressions, such as a naturalist would be

proud to possess. There is another, and we think a better method of taking leaf impressions, than the preceding one. The only difference in the process consists in the use of printing ink, instead of smoked oil-paper.

LEAF. *To make a Fac-simile in Copper.*—This beautiful experiment can be performed by any person in possession of a common galvanic battery. The process is as follows:—Soften a piece of gutta percha over a candle, or before a fire; knead it with the moist fingers upon a table, until the surface is perfectly smooth, and large enough to cover the leaf to be copied; lay the leaf flat upon the surface, and press every part well into the gutta percha. In about five minutes the leaf may be removed, when if the operation has been carefully performed a perfect impression of the leaf will be made on the gutta percha. This must now be attached to the wire in connection with the zinc end of the battery (which can easily be done by heating the end of the wire, and pressing it into the gutta percha), dusted well over with the best black lead, with a camel's hair brush—the object of which is to render it a conductor of electricity—and then completely immersed in a saturated solution of sulphate of copper. A piece of copper attached to the wire in connection with the copper end of the battery, must also be inserted into the copper solution, facing the gutta percha but not touching it; this not only acts as a conductor to the electricity, but also maintains the solution of copper of a permanent strength. In a short time, the copper will be found to creep over the whole surface of the gutta percha, and in about twenty-four hours a thick deposit of copper will be obtained, which may then be detached from the mould. The accuracy with which a leaf may thus be cast is truly surprising. I have in my possession a cast of a hazel-leaf made by the process, which nobody would take to be a production of art; every fibre and nerve, in fact, the minutest part, is delineated with the utmost fidelity.

LEAF PRINTING.—After warming the leaf between the hands, apply printing ink, by means of a small leather ball containing cotton, or some soft substance, or with the end of the finger. The leather ball (and the finger when used for that purpose), after the ink is applied to it, should be pressed several times on a piece of leather or some smooth surface, before each application to the leaf, that the ink may be smoothly and evenly applied. After the under surface of the leaf has been sufficiently inked, apply it to the paper, where you wish the impression; and, after covering it with a slip of paper, use the hand or roller to press upon it, as described in the former process.

LITHOGRAPHIC PAPER.—1. Starch 6 oz.; gum arabic 2 oz.; alum 1 oz.; make a strong solution of each separately, in hot water, mix, and apply it while still warm to one side of leaves of paper, with a clean painting-brush. When dry, a second and a third coat may be given; lastly, press it, to make it smooth.—2. Give the paper three coats of thin size, one coat of good white starch, and one coat of a solution of gamboge in water; the whole to be applied with a sponge, and each coat to be allowed to dry before the other is applied. The whole of the solutions should be fresh made.

Lithographic paper is used to write on with lithographic ink. The writing may be trans-

ferred by simply moistening the back of the paper, and evenly pressing it on the stone, when a reversed copy is obtained, which may be used to print from, and will yield corrected copies, resembling the original writing or drawing.

LITHOGRAPHY.—There are two modes of lithography in general use. For the one a drawing is made on the lithographic stone, with a lithographic crayon, or with lithographic ink, and when the design is dry, a very weak solution of oil of vitriol, or muriatic acid, is poured upon the stone, which acts by removing the alkali from the chalk or ink used to draw the design, and thus leaves them in a permanent and insoluble form. The acid also removes a very small portion of the surface of the stone occupied by the lights of the drawing, and renders it more absorbent. In the other method, the design is made on lithographic paper, (see the last article,) which paper, on being moistened, laid on the stone, and passed through the press, leaves its design on the stone, which is then acted on by acid as before described. To print from stones so prepared, water is thrown on them, and the roller, charged with printing ink, passed over them, when the paper is applied, and a copy is obtained by the action of the press. The same process must be had recourse to for each copy. The nature of the stone is such that it retains with great tenacity the resinous and oily substances contained in the ink or crayon employed to form the design, and also absorbs water freely; this, combined with the peculiar affinity between resinous and oily substances, and their mutual power of repelling water, occasions the ink on the printing roller to adhere to the design, or resinous portion, and to leave untouched the lights or watered parts of the stone. The stones are prepared by polishing in the ordinary way; the style of work for which they are intended determining the degree of labor bestowed upon them. For crayon drawings, the surface should have a fine grain, but the finish of the stone must depend upon the desired softness of the intended drawing; for writing or drawing on in ink, the surface must receive a higher polish, and must be finished off with pumice stone and water. The best lithographic stones are obtained from Solenhofen, near Munich, and from Pappenheim, on the banks of the Danube. The white lias which lies immediately under the blue, near Bath, also yields good lithographic stones.

MAGIC PHOTOGRAPHS, To Make.—Take, in the first place, an ordinary print—a card-picture, for instance—on albumen paper, beneath the negative in the usual way, and, when sufficiently printed, let it be carefully washed in the dark room, so as to remove all the free nitrate of silver, etc. Now immerse it in the following solution, also in the dark room: saturated solution bichloride of mercury (corrosive sublimate), one ounce; hydrochloric acid, one drachm. The saturated solution is previously prepared by putting into water more bichloride of mercury than it will dissolve by shaking in about twelve hours.

The print will gradually be bleached in this liquid, in the ordinary meaning of the word—that is, it will disappear; but the fact is, the print is still there—its color alone is changed, a double salt having been formed of mercury and silver, which is white, as many of our readers, who have been in the habit of intensifying with a

mercurial salt, are aware. As soon as the print has quite disappeared, the paper is thoroughly washed and dried in the dark room; it is also preserved between folds of orange-colored paper, in order to keep it from the action of light, for the surface is still in some measure sensitive to light.

The bleaching of the print—that is, its conversion into a white salt—is effected more quickly by keeping it in motion in the mercurial solution.

As we said before, the print has not been bleached in reality—the substance which originally formed it is still there, together with a new substance, a salt of mercury. But the two salts of silver and mercury may be easily brought out and made visible by several solutions, such as sulphide of ammonium, solution of hydrosulphuric acid; in fact, any of the soluble sulphides, ammonia and hyposulphite of soda. The latter salt is used in preference to the others. Small pieces of blotting-paper, therefore, of the same size as the prints, are cut out and steeped in a saturated solution of hyposulphite of soda, and then dried.

The magic photographs are packed, as before stated, between folds of orange-colored paper; the papers dipped in hyposulphite of soda are the developers, and may be packed between two sheets of common writing-paper. The development of the image is effected in the following manner: place the albumen paper which contains the whitened print on a pane of glass, print side upward; on this lay the dry piece of blotting-paper that has been previously dipped in hyposulphite of soda. Moisten the latter thoroughly, then place over it a pane of glass, and upon this a weight, to bring the two pieces of paper into intimate contact. In a very short time the picture will appear in all its original detail, and of a sepia tone.

MICROSCOPIC PHOTOGRAPHY.—There are two kinds of so-called microscopic photographs. The first are small photographs of large objects, to be examined with a magnifying glass, or even with a microscope. These are chiefly made as a curiosity and for amusement, but occasionally for a useful purpose. In preparing micrometric scales, for instance, a very small photograph of a large measure is made to be used with either the microscope, spectroscope, solar or hydro-oxygen microscope, or magic-lantern. It is one of the most indispensable tools of the investigator. Such microscopic photographs may be either made by a common photographic camera by providing the tube between the lenses with a diaphragm with very small aperture, in order to have a perfectly sharp image, and placing the object to be photographed at a very great distance; or the photograph may be made with a common microscope, by inclosing the stage (which carries the object to be examined) in a box which excludes all light except that which falls through the tube. If, then, in front of the tube, which may be either in vertical or horizontal position, a well-illuminated object is placed, the microscope lenses will throw a very small image of it on the stage, in the same way as the lenses of a photographer's camera throw a large image on the ground glass. The operation of producing the picture is exactly the same as in common photographs, except that extraordinary care is required for the perfect pro-

duction of such small images, in which a single grain of dust is sufficient to ruin the whole.

Use has been made of this means, in time of war, to carry microscopic maps of fortifications, etc., inclosed in a watchcase, or even in a ring, which by their minuteness escaped detection under the most scrutinizing search.

The second and much more important kind of microscopic photographs, which we shall describe in greater detail, are the enlarged photographs of microscopic objects. They can not be produced by a common photographer's camera, and require either a microscope or a photographic camera especially made for the purpose.

First there is required a common compound microscope placed in a horizontal position. The end of the tube which commonly carries the eyepiece is inserted in a photographer's camera-box, from which the tube and lenses have been removed. The tube of the microscope is provided with a diaphragm, which excludes all light from the box, except that which enters through the microscope lenses. The object to be photographed is held in place on the stage with properly applied small springs.

For the illumination, an independent mirror, diaphragm, lens, and blue plate glass, may be used, the latter for the purpose of excluding, during the adjustment of the boxes, all red, orange, and yellow rays which do not contribute to forming the image. The focus found with this blue light will better coincide with the chemical focus (which alone makes the picture) than that found with the full light. During the exposure for making the picture the blue glass is removed, as the red, orange, and yellow rays intercepted by it do not interfere, even if the microscope is not achromatic, and the blue glass itself can not possibly increase the chemical action of the light, but on the contrary absorbs some rays and retards the operation, the opinion of certain photographers to the contrary notwithstanding.

The whole system for illumination may be turned around an axis below, causing the light not to fall through the microscope but obliquely on the object, so that less light from the mirror, but most from the small object near passes through the microscope into the camera-box, where the focusing is done by means of the ground glass, and this subsequently replaced by the prepared sensitized surface in the usual manner. The use of this oblique light is of the utmost importance, as well in common observations of very delicate structures by high powers with the eye, as in the microscopic photography of the same. Some objects are so exceedingly thin, and the details are so delicate, that they are drowned in the flood of light, when the illumination throws the light directly through the axis of the whole microscope. The eye sees too much light; much more of the light, in fact, than of the object intended to be seen. But when the light is thrown obliquely on the object, so that, not the direct ray from the reflecting mirror, but that coming from the illuminated object reaches the eye, details are seen, impossible to distinguish in any other way. Also in photographing with such oblique light, details may be photographed which with direct light never could be obtained at all. More than that even; by proper arrangements details have been photographed which never have been seen by the eye. Thus, the markings on one of the so-called diatoms, the

pleurosigma angulatum, of which a common microscope shows no trace, and which with a good microscope can only be seen by oblique illumination as lines, or by stronger power as a set of triple lines crossing one another at angles of sixty degrees, with the highest powers of the best microscope appear to be hexagons, arranged as in a honeycomb, thus revealing that the lines seen by lower magnifying powers are but illusions, produced by the regular arrangement of the hexagons. These now are shown, by means of microscopic photography, to be no hexagons at all, but circular depressions, which give the illusion of hexagons by their arrangement, in which every circle is surrounded by six others.

NATURE PRINTING, Dresser's Process of.—The process is one by which images of foliage may be taken by any who have leisure and choose to devote an hour or two to the registration of the beautiful forms of our leaves. The process, by its simplicity, commends itself; and the results gained are of the most charming character. The Vienna process of nature printing has achieved much, and produced results of the most admirable character; but the process necessitates the use of dried vegetable specimens, in order to the production of the image. While this is at least no drawback in the case of ferns, and is perhaps even an advantage, yet it strongly militates against the process in the case of many other plants. In order to meet this difficulty, Dr. Dresser suggested an "Improved Nature Printing" process which he patented, in conjunction with Dr. Lyon Playfair, in which impressions are taken from the living plant, and which may be substantially described as follows: A sheet of foolscap writing-paper should be provided, a handful of fine cotton-wool, a piece of muslin, one or more tubes of common oil-paint (according to the color required), a little sweet-oil, and a quantity of smooth, soft, cartridge-paper, or better, plate-paper. Having placed the sheet of foolscap-paper while doubled (the two thicknesses making it a little softer), on a smooth table, squeeze from the tube about as much oil-color as would cover a shilling, and place this on one corner of the sheet of foolscap; now form a "dabber" by inclosing a quantity of the cotton-wool in two thicknesses of muslin, and tying it up so as to give it roundness of form. Take up a portion of the oil-paint from the corner of the paper, with the dabber, and by dabbing give the central portion of the sheet of foolscap a coat of color. This dabbing may be continued for half an hour or more with advantage, taking a small quantity more color when the paper becomes dry; two or three drops of sweet-oil may now be added to the paper and distributed by the aid of the dabber, if the color is thick, when the paper will be fully prepared for use.

The paper may be left for an hour or two after being first coated with color without injury, and, indeed, this delay is favorable, for until the paper becomes impregnated with oil, the results desired are not so favorable as they become after the paper is more fully enriched with this material. While the color is soaking into the paper, a number of leaves should be gathered which are perfect in form and free from dust; and these can be kept fresh by placing them in an earthenware pan, the bottom of which is covered with a damp cloth, but it will be well to place a damp cloth over the orifice of the pan also. Selecting a

woolly, hairy leaf, place it on the painted portion of the sheet of foolscap, and dab it with the dabber till it acquires the color of the paint used; this being done turn the leaf over and dab the other side; now lift it from the paint paper by the stalk, and place it with care between a folded portion of the "plate" or "cartridge" paper, and if the stalk of the leaf appears to be in the way, cut it off with a pair of scissors; now bring down the upper portion of the folded piece of paper upon the leaf, and rub the paper externally with the finger, or a soft rag, bringing the paper thus in contact with every portion of the leaf. If the paper is now opened, and the leaf removed, a beautiful impression of both sides of the leaf will be found remaining. In like manner, impressions of any tolerably flat leaves can be taken; but harsh leaves will be found most difficult, and should hence be avoided by the beginner. While the paper is yet rich in color, downy leaves should be chosen; but color may at any moment be added, care being always taken to distribute the paint evenly over the paper with the dabber before the latter is applied to the leaf, and the dabber is always removed from the painted paper till the color is exhausted, when the paper is again replenished from the reserve in the corner.

As the color on the paper becomes less and less in quantity, smoother leaves may be employed; and when the paper seems to be almost wholly without paint, the smoothest leaves will prove successful, for these require extremely little color. Should the natural color of the leaf be desired, it can be got by using paint of the color required; but, in many cases, purely artificial tints produce the most pleasing and artistic results; thus, burnt sienna gives a very pleasing red tint; and of all colors this will be found to work with the greatest ease.

By the process now described, the most beautiful results can be gained; but the effect will be better, if, when the impression is being rubbed off, the leaf, together with the paper in which it is inclosed, is placed on something soft, as half a quire of blotting paper. Should the first attempt not prove very satisfactory, a little experience will be found to be all that is required, and now the most common leaf will be seen to have a form of the most lovely character.

Collections of leaves of forest-trees will prove of the deepest interest, or of all the species which we have of any kind of plant; thus, if the leaves of the black, red, American, and golden currant be printed together with that of the gooseberry, all of which belong to one botanical genus or group, the variation or modification of the form will be seen to be of the deepest interest.

NEGATIVE, Fixing the.—Use a saturated solution of hyposulphate of soda. In some of the galleries they add 1 ounce of cyanide of potassium to 4 quarts of the hypo solution.

NEGATIVE, An Auxiliary.—One of the novelties introduced at a late convention, was a negative for producing a watered or grained effect over such parts of the print as may be desired. The result is obtained by printing for a few moments under a fixed position, and then changing ever so little the position of the auxiliary negative. Imitations of watered silk, also of grains of wood can be readily obtained, and serve to give a new character to the picture.

NEGATIVE BATHS (old), Preservation of.—Worn out negative baths are usually got rid of

by precipitating the silver, reducing to metallic state, fusing, and again dissolving. This is a process so long and complicated that most photographers shun to make it, and pour their old baths into the general receptacle for slops, to be sold or got rid of in the easiest way possible.

Mr. Brooks in the "Year Book" proposes the reduction of the negative bath to carbonate of silver to purify it. Dilute the bath to about three times its bulk with distilled water, neutralize with carbonate of soda until a slight turbidity is produced, and sun for several hours; then decant, if necessary, and add sufficient carbonate of soda, free from chloride, to precipitate all of the silver as carbonate. After well washing this precipitate in water, it is in condition to be dissolved in nitric acid of a proper strength to yield a new negative bath.

NEGATIVE Preservers.—All sorts of contrivances have been suggested for preserving negatives, but most of them are cumbersome and expensive. It is now proposed to put them into paper envelopes, and set them aside in boxes, after they have been properly designated. The paper protects them from rubbing, and the expense of grooves, partitions, slides, and other contrivances is avoided. They occupy the least possible bulk when put up in this way, and if laid on edge in boxes, like shelves, can be readily removed in case of fire. Envelopes are now made of the sizes to fit the glasses usually employed by photographers.

PAINTING, Oil.—First, the general outline should be familiar, and as correct a sketch of the desired picture obtained as possible. The requisites for a "fitting out," consist of colors, brushes, palette, palette-knife, canvas, easel, hand-rest, oils and varnish. Brushes are round and flat, the latter is used for the sky, the badger brush is used to soften and blend together sky and other parts. Clean your brushes by first wiping with dry cloth, and afterwards wash in turpentine, rinsing in cold water. To prepare canvas, coat the material with strong warm isinglass size, when dry coat with oil paint. To facilitate drying, litharge, sugar of lead, etc., may be added. Magilp is an indispensable article in oil painting, it tempers the colors, and hastens the drying; it is made of equal parts of strong mastic and clarified oil; copal varnish is often used instead of mastic. The different oils used, are, linseed, poppy, drying, and nut-oil; linseed is recommended in preference to others. When smooth surface is desired, it is requisite to rub the surface with pumice, sand, and water. Light while painting should fall over the left shoulder; a North light is preferable, because more uniform.

First make your sketch; you can first trace it with charcoal or white crayon; then mark correctly with pencil, dusting off the crayon as you proceed. Begin by preparing tints for the sky, get sufficient white from the tube at once and thin with oil. Mix the following colors as near the tints as the subject demands, viz., white, French or permanent blue, vermilion, Naples yellow, and yellow ochre. The same tints strengthened with more color will do for the mountains, more yellow ochre for mid distance, and work gradually to the foreground, for which mix a set of requisite tints, all separate, and place the color at once where it shall remain. This completes the first painting, and

we proceed with the second, third, and finishing, and observations.—*Second Painting.* The first painting should be perfectly dry before commencing the second. The less drying oils used the better, for when paints are used in their natural state they don't sink as much, and give better satisfaction. Prepare the palette with the required tints for the clouds, and paint them in with a little more attention to the shape, and light, and shade. When done, soften with a blender. Next in order come the mountains; attend more particularly to their shapes and different shades. Let the early painting be of a light style of color, for, in finishing, the colors are made much cooler by the process of glazing and scumbling. You find that the colors, while drying, sink, and partake a little of the color beneath them. Therefore this second painting should give a good idea of the effect of what the picture should be.—*Third Painting.* It may be requisite to aid the effect of the distance by a few touches of scumbling and glazing, and also in bringing out desirable effects in the middle-ground. Such tints can be used for these purposes as occasion requires, either lighter or darker than the parts to which they are applied. When advanced thus in your painting, do not attempt too much at one sitting, as the different glazings may interfere with each other, destroying the transparent effect. It is better to allow the colors to dry gradually, and repeat the glazing another time.—*Observations.* 1. The sky, in some pictures, is very important, having an influence over the entire painting. The tints are more or less gradually mixed with white. They are kept lighter as they approach the sun. The colors vary, but the tints should be produced by few. The most useful sky colors are white, French or permanent blue, vermilion, madder lake, Naples yellow, and yellow ochre.

2. The bounding sky line, or extreme distance, varies very much in tone—sometimes seen plainly, and at others scarcely distinguished from the horizontal tones. You need suitable colors for these effects. Sometimes distant mountains have their summits quite visible, and their bases, although much nearer, not seen. This is caused by mists and vapors. Scumbling is necessary to obtain this effect.

3. If possible, paint in the distance, when the sky is moist with the same tints, only stronger, as the case may be. Otherwise, scumble over the lower part of the sky at the next painting. This produces a good effect.

4. Nearer the foreground, as objects advance, a little more distinctness may be given. Accidental touches of light are important in separating the foliage and other objects through the picture from distance to foreground. Indian red, terre verte, Venetian red, Antwerp blue, emerald green, and raw sienna, add to the colors enumerated. Grays produced by vermilion and emerald green can be varied by a little Vandyke brown or Naples yellow.

5. The color and shape of trees and the disposition of the branches should be carefully studied. Pencil in the foliage against the sky, and all the extreme parts, with a small brush neatly.

6. In foregrounds the landscape is not intended to be painted with botanical accuracy. Nor should you be too broad, coarse, and careless, but finish with a general harmony of the whole.

7. Let the distance and horizon meet together

in a certain degree, so as to know where each finishes and begins. Mid distance should be made out more clearly, and attention paid to details of the foreground.

8. When you have colors in powder, as is often requisite, a glass slab, in addition to palette, is necessary, on which to mix and grind them when required.

Figure drawing is indispensable in landscape painting. Their introduction into landscapes serve to enliven and break the monotony, and also serve as measurement, whereby we form ideas of the real size of objects. The height of an average figure is eight times that of its head. If a perpendicular line is drawn, allow half of it for the lower portion of the body, and half for the upper, from shoulder to shoulder two heads wide.

PAINTINGS, To Preserve and Restore.—Many valuable paintings suffer premature decay, from the attacks of a microscopic insect of the mite class. The best method of preventing this species of decay, is to add a few drops of creosote to the paste and glue used to line the picture, as well as to make a similar addition to the varnish. If it has already commenced, the painting should be at once carefully cleaned and re-lined, observing to employ a little creosote in the way just mentioned. Paintings should be kept in as pure an atmosphere as possible, and in a moderately dry situation; as it is the presence of sulphureted hydrogen in the air that blackens the "lights," and causes most of the middle tints and shades to fade; and it is exposure to damp that produces mouldiness and decay of the canvas. For this reason valuable paintings should not be kept in churches, nor suspended against heavy walls of masonry, especially in badly-ventilated buildings. Excess of light, particularly the direct rays of the sun, also acts injuriously on paintings. The blackened lights of old pictures may be instantly restored to their original hue, by touching them with deutoxide of hydrogen, diluted with 6 or 8 times its weight of water. The part must be afterwards washed with a clean sponge and water.

PAINTING, Water Color.—This is one of the most beautiful, as well as most difficult, of the fine arts. It will require, in addition to a natural taste, much industry, which is indispensable to success. There are two kinds of water colors in general use. We prefer using the moist colors for landscape painting, and the dry cake colors for flowers. Moist colors are put in little earthen cups, and fitted into a box, all complete for painting out of doors. The materials for water color painting are:—Colors, sable brushes, paper, a drawing board, an eraser and a piece of silk for wiping out the lights, a bottle of gum-water, a soft sponge, a one and a half inch flat camel's hair brush, a china palette, or set of saucers.

The most desirable paper for landscapes should be rather rough on the surface. If too smooth, your painting loses much of the boldness characteristic of fine work. Whatman's paper is thought the best.

In selecting brushes, get those which come to a point when charged with water, and, when bent a little to one side, spring back again without splitting.

Colors for landscapes are:—Gamboge, French blue, raw and burnt sienna, yellow ochre, Vene-

tian red, Vandyke brown, Prussian blue, olive green, brown madder, crimson lake, Indian yellow, and a bottle of Chinese white.

To stretch and prepare the paper. The painting side of Whatman's paper is known by holding up the paper between your eye and the light, and reading the name in proper position from left to right. This must be the right side. Place the paper on a table, and moisten the back well with a soft sponge and clean water. If the paper is thick, let it remain a short time, so that it may become saturated; then place it in the frame of your drawing board, confining it with the cross-bars. Sometimes the paper is put on a plain clamped drawing board, fastened with glue about the edges.

Wiping out lights. The parts of the picture (after the color is on) that require lights should be treated as follows:—Mark out with your brush and clean water the parts you wish lighter, and then apply blotting paper to absorb the moisture; then wipe it hard with a silk handkerchief, and, if not sufficient, repeat it. If you desire it still lighter, use the rubber.

Before using the eraser for extra high lights, the painting must be perfectly dry.

Using the brush. After making suitable outlines with sepia or Indian ink, it is well to commence brush work. As a rule, the brush for broad shades should be pretty full of color; but, for finishing, all colors are worked much drier with the point of the brush chiefly.

Outline. When the paper is properly stretched on the drawing board, and is sufficiently dry, commence the outline. For landscape, sketch lightly at first, so that the marks may be removed, if required, as hard rubbing is liable to disturb the surface of the paper. Spare no pains in the sketch, and bring out all the minute details. A good sketch should be lightness in the extreme distance, working stronger towards the foreground. In the foreground, boldness, with fineness of line on the light side, and depth on the shade side.

In beginning to color, the drawing should be raised at the back, to allow the color to flow downward. Moisten all your drawing with a large flat brush. Use blotting paper to absorb the moisture. In your sketching-box should be little cups. In one of these make a pale tint of Indian yellow and crimson lake; in another, French blue, with some of the other with it, so as to make it pearly. Then work in the crimson tint, adding a little more Indian yellow as you approach the horizon. Carry the tints to the edge, and vary with burnt sienna, yellow, or the pearly tint, according to your subject. When dry, if the colors are not blended well together, or are too dark, pass the flat brush with clean water back and forth to subdue and soften them. The whiteness of the paper will thus be removed, and form an undertone for colors that come over them. The sky may now be tinted with French blue, and clouds formed. The distant hills can be carefully painted with pearly gray, and increased as you proceed toward middle distance, adding more or less madder brown and yellow ochre, as the case requires. The distant hills can be strengthened, if required, with French blue, or warmed with crimson lake. Keep the foreground paler than the general tone. Finish the sky and hills before the trees are commenced. Leave a little opening now and then for the light

to strike through, beginning at the top and working downward with the brush well charged, varying the greens as you wish, making them of gamboge, raw and burnt sienna. Increase the tone of shadows with another brush, but the same color, adding a trifle more blue and some crimson lake for neutral tint. All foliage that catches the sunlight should incline to a yellow tint. Paint the trunks and stems with Vandyke brown. Repeat the tints on foliage when dry, until the required form and depth are obtained. Gum will enrich and bring out the dark shadows. Never use it in sky or distance, as it washes off easily and disturbs all colors near it. For winter trees, cobalt blue and Vandyke brown, mixed, make good color for network and branches of pine trees. Opaque white is serviceable in finishing or introducing figures in the foreground. Parts can be penciled in white, and stained with requisite colors.

PAINTING (FLOWER, In Water Colors.—The colors and materials requisite are carmine, crimson lake, cobalt blue, Prussian blue, vermilion, gamboge, raw sienna, burnt sienna, burnt umber, Chinese white, yellow ochre, and Indian ink—a set of saucers, dissolved gum arabic, and a few sable brushes. Rose pink, royal scarlet, Indian yellow, Indian red, indigo, sepia, Vandyke brown, and emerald green, may also be added for flowers of superior finish.

Whatman's hot-pressed paper, stretched on a board, as in landscape painting, is used to good advantage. Bush flowers are generally painted on London board, the ivory surface sometimes preferred. Make an accurate and clean sketch with fine pointed pencil, drawing the marks faint, so as not to use rubber often. When sketched, moisten all parts intended for painting with a brush moderately filled with water. Never use hard water, unless it has been boiled. This prepares the paper to receive the colors. Some use a slight shade of neutral tint or Indian ink to coat over the shaded parts, blending the shades so that they are imperceptibly lost. Flowers and leaves are treated the same. Two brushes are used, one charged with color, the other nearly dry. After this process, cast with local color, finish with soft washes or small touches, which is called stippling, and, when done nicely, is beautiful; but as it takes time, washes are more generally adopted. Practice will accustom the eye to notice variety of shades, which before could not be discriminated.

Green leaves, when a yellowish pale green and bright, are painted with gamboge and a little Prussian blue, penciled over until the effect is obtained. Use more Prussian blue for darker green leaves, finishing with stronger color. For the deepest shades, add a little crimson lake, or Vandyke brown, or burnt sienna, as the shade requires. For decayed leaves, use burnt sienna, Indian yellow, and crimson lake.

Yellow Flowers. First examine whether the shades are warm or cool: if the latter, paint them with Indian ink; if the former, use a little burnt umber. When dry, coat evenly with gamboge—the general tint of the flower. Where the high lights should be, wash out a little with another brush while it is moist. Repeat the color in the stronger parts, finishing, if requisite, with a little carmine or burnt sienna mixed with gamboge.

Blue Flowers. Coat them evenly with cobalt,

according to tint. A little rose madder added to cobalt may be used, as the tints should vary. Shade the deeper parts with a little Prussian blue added to it; and if a very deep tint is required, add a little indigo.

Purple Flowers. Make the desired tint with carmine and Prussian blue, increasing the shade to the depth required, using more color and less water.

Scarlet Flowers. Paint the shades in with cobalt blue and a little Indian red; then coat smoothly with royal scarlet, or carmine and gamboge mixed, finishing up with carmine on the shades. If coated with royal scarlet, add carmine in finishing.

White Flowers. Some are first shaded with Indian ink, and others with neutral tint, made of cobalt, rose madder, and Indian yellow.—When dry, slightly tint some of the petals with a weak shade of yellow ochre, some parts with cobalt, others with a greenish neutral. The anthers, if not left white, should be done with permanent white added to Indian yellow, and carefully dotted with weak burnt sienna.

The Deep Crimson Rose. Shade all the petals more or less with Indian ink, until it would pass for a finished drawing in Indian ink, and then coat twice with strong carmine, finishing deep shades with a little Prussian blue added to carmine.

Pink Rose. Paint in the shades with cobalt blue, and coat over with a pale shade of carmine, with a little vermilion added. Repeat this on some of the petals, until the requisite depth is obtained. Some of the outside petals may need a second coat of cobalt to give them a thin, transparent appearance.

Arranging and Grouping. With those who possess a good eye for color, the most pleasing arrangements easily suggest themselves. Sometimes the most pleasing effects are obtained by placing the light flowers in the center, such as pink, white, and pale yellows, placing the rich dark colors outside, such as dark roses, etc., thereby making a substitute for light and shade. The most pleasing groups are painted with a predominance of warm coloring.

PAPER, TRACING.—1. Open a quire of double crown tissue paper, and brush the first sheet with a mixture of mastic varnish and oil of turpentine, equal parts; proceed with each sheet similarly, and dry them on lines by hanging them up singly. As the process goes on, the under sheets absorb a portion of the varnish, and require less than if single sheets were brushed separately. It leaves the paper quite light and transparent, it may readily be written on, and drawings traced with a pen are permanently visible. Used by learners to draw outlines. The paper is placed on the drawing, which is clearly seen, and an outline is made, taking care to hold the tracing paper steady. In this way elaborate drawings are easily copied.

Tissue paper may also be made transparent by using—2. Nut oil and oil of turpentine, equal parts, dry the paper with wheat-flour immediately.

—3. Canada balsam, and turpentine to thin it.
PAPER, TRANSFER.—Make a mucilage with $\frac{1}{2}$ oz. of gum tragacanth, strain, add 1 oz. of glue, and $\frac{1}{2}$ oz. of gamboge. Mix French chalk, 4 ozs.; old Paris plaster, $\frac{1}{2}$ oz.; starch, 1 oz.; run them through a sieve, grind with the mixed mucilage, add water to reduce to the con-

sistence of oil, and apply it with a brush to thin sized paper. The drawing made on this prepared side of the paper is wetted at the back and placed on the stone, which is warmed to 125° F., the whole is then strongly pressed in the lithographic press, and the stone receives the impression, which may be printed from as usual. When two impressions are required, a red composition is made of wax, 2 parts, soap, 1 part, and vermilion to color, all melted in a saucepan, and ground with water to the consistence of cream. This is spread thinly on the second stone, an impression from the first stone is next applied, and the second drawing is thus made to correspond with the first exactly. If, in printing, the drawing becomes smutty, mix equal parts of water, olive oil, and oil of turpentine, shake till they froth, wet the stone, throw this froth on it, and rub it with a soft sponge. The printing ink will be dissolved, and the drawing will almost disappear, but, on rolling it, it reappears as clear as at first. When the stone is laid by for future use, a preserving ink is applied, to prevent the surface printing ink becoming too hard. Thick varnish of linseed oil, 2 parts, tallow, 4 parts, wax and Venice turpentine, of each 1 part; melt; by degrees, lamp-black, 4 parts, mix thoroughly, and preserve in a tin case. This must be rolled on the stone each time before laying it aside for future use. When the whole of the impressions are completed, and the stones required for other drawings, two of the stones are laid face to face and ground with sand and water until the surfaces are clear. They are finally, more or less, polished with pumice stone, according to the required fineness, and are then prepared to receive other drawings.

PAPER, To prepare for PHOTOGRAPHS.—Dissolve 20 parts of citric acid in 200 parts of distilled water. Pour the solution into an earthen or porcelain dish (the bath should be abundant, so that the paper may swim freely in it—the action is hastened by the application of a gentle heat;) allow several sheets to remain in it for an hour or two, then remove them, and place them on another dish, containing water rendered alkaline by 5 per cent. of ammonia, washing finally in pure water. Removed from this, suspend the papers by one corner, and allow them to dry thoroughly, protected from dust.

PAPER, Sensitizing.—Fredericks uses 35 grains silver to the ounce of water; to each ½ gallon add ¼ ounce muriatic acid; neutralize with liquid ammonia; filter to remove chloride, float 30 seconds, fume 10 minutes. Gurney uses 40 grains silver, slightly alkaline, or with 1 drop ammonia added; float 40 seconds, fume 10 minutes. Sarony uses 50 to 55 grains silver, slightly acidulated with nitric acid; float 1 minute, fume 15 minutes. Kurz uses 60 grains silver, slightly acidulated with nitric acid; float 1 to 2 minutes, fume 15 to 20 minutes.

PAPER (PHOTOGRAPHIC), Durable Sensitive.—At a recent meeting of the Berlin Photographic Society, the President exhibited a specimen of silvered albumenized paper, the advantages of which are here explained.

In six ounces of distilled water is dissolved one ounce of nitrate of silver (free from acid), and in another similar quantity of water one ounce of chemically pure citric acid. When both compounds are completely dissolved in their respective liquids, the latter is poured into the former,

the combined solution being well shaken, and subsequently filtered. Finally one ounce of alcohol is added.

It is quite sufficient if the paper is allowed to float upon the liquid for the space of a minute, or, at any rate, until it swims evenly upon the surface in all parts. Coagulated paper presents more brilliancy, when printed and finished, than that which is not coagulated.

Upon the purity of the citric acid depends the clearness of the bath, for if the acid is at all impure, a grayish precipitate is formed—probably citrate of silver. At the same time, if this precipitate is filtered off, the results obtained are still of a favorable character. The bath will remain perfectly clear and transparent, even after considerable use.

The durability of the sensitive albumenized paper produced in this manner appears to be quite unlimited, for some sheets of the material which were prepared some nine months back are as white and fresh now as when first sensitized.

The advantages entailed by the employment of the citrate silver bath are not to be despised, for besides the convenience of always having sensitive paper ready at hand, there is obviously less chance of loss from the paper becoming yellow and useless during a lengthened period of unfavorable weather.

PICTURE, To Print from the Print itself.—The page or print is soaked in a solution first of potass, and then of tartaric acid. This produces a perfect diffusion of crystals of bitartrate of potass through the texture of the unprinted part of the paper. As this salt resists oil, the ink roller may now be passed over the surface, without transferring any of its contents, except to the printed paper.

PLATES, Hot Cast Cryolite.—These are now made in this country perfectly flat, from three sixteenths to one quarter inch in thickness, and are ground on one side and polished on the other. They are a great improvement on the milk glass and porcelain, formerly used by photographers. Being of a pure white color, rich tones and beautiful results are easily obtainable. Their flatness and thickness render them secure from breakage.

PORCELAIN, Pictures on.—The plates for these pictures are sold as porcelain, but are really an opaque white glass. The plate is coated with collodion, rendered sensitive in the usual way, and the image received from a negative adjusted as follows:

The negative is placed at one end of a box, the other end of which joins the front end of a camera having a quarter tube. The object of this box is to cut off extraneous light. The negative is placed toward the sun, or a piece of white paper placed in the sun. The image formed by the negative is focused on the ground glass of the camera, in the usual manner. The box in front should admit of being varied in length, in order to alter the size of the picture, by changing the distance of the negative from the lens.

The white sensitive plate is then exposed and developed with the ordinary iron developer. After washing off with the developer, fix with a weak solution of cyanide of potassium.

The picture requires to be darkened with a weak solution of bichloride of mercury, chloride of gold, or chloride of platinum. As soon as the picture appears of the proper shade arrest the ac-

tion of the strengthening agent, by washing the plate under a copious stream of water.

PORCELAIN PROCESS and Collodion.

—Coat a porcelain plate with collodion, sensitize in the negative bath, the same as proceeding with an ordinary negative, place it, when coated, in the plate holder, then take any negative you wish to make a picture from (one not too intense is best). Curtain a window with dark paper or cloth, and cut a small opening the right height for the camera. Put your negative in the opening cut from the curtain, and make a picture on your porcelain plate, as the case may require, large or small, the same as if copying a picture; develop, then wash, fix with cyanide, and tone with gold, mercury, or sulphuret. Wash, dry, color, and varnish. Exposure from five to thirty seconds.

POSITIVES (Direct) on Glass.—In developing a glass positive, the solution of sulphate of iron should be flowed evenly over the film, and in some quantity, so as to wash off a portion of nitrate of silver into the sink.

PRINTS, To Transfer to Glass.—Take of gum sandarac, 4 oz.; mastic, 1 oz.; Venice turpentine, 1 oz.; alcohol, 15 oz. Digest in a bottle, frequently shaking, and it is ready for use. Directions: use, if possible, good plate glass of the size of the picture to be transferred, go over it with the above varnish, beginning at one side, press down the picture firmly and evenly as you proceed, so that no air can possibly lodge between; put aside, and let it dry perfectly, then moisten the paper cautiously with water, and remove it piece-meal by rubbing carefully with the fingers; if managed nicely, a complete transfer of the picture to the glass will be effected.

PHOTOGRAPH COLORING.—Select a light photograph for coloring, and let the general hue be gray, inclining to black in the shadows.

Albumenized paper seldom requires any preparation, but need only be carefully washed with cold water and a soft sponge.

A preparation of gum is generally used in the colors for albumen paper. It should be dissolved in water, or allowed to boil up; after which, bottle to keep from dust.

A little white sugar is added by some artists; and the preparation should be used as thin as possible and allow the colors to adhere readily to the paper.

The following colors are necessary in cakes, Windsor and Newton's being considered the best:—Carmine, vermilion, rose madder, light red, crimson lake, Roman ochre, Indian yellow, gamboge, cobalt blue, emerald green, indigo, Prussian blue, burnt sienna, burnt umber, sepia, Van Dyke brown, madder brown, ivory black, Chinese white, (half cakes at half price).

Sable brushes are best, and should not be used too small, except for delicate work, such as marking in the eyes, nostrils, etc. A middling size is preferable, but see that there are no straggling hairs about them and that they do not split or divide.

Coloring the Face.—Commence, with large brush, to wash in the flesh tint: go over the whole flesh as smoothly as possible; light red is the most desirable, being a fast color; for very fair complexions orange vermilion is used.

Put pale wash of cobalt blue in the half tints, Indian yellow in dark shadows, with vermilion and carmine (mixed) over it.

After the washes in the face, put in the hair, draperies, background, etc.

Stipple the whole flesh with tints of light red, or Indian yellow and pink madder mixed.

Stipple rose madder on cheeks, lips, tip of the chin, tip of ears and over the nose where the eyes meet; cobalt blue in temples and about the shadows of the eyes and mouth.

Stipple light tint of Indian yellow over the cheek bones; in faces of old persons more Indian yellow is used; also in faces of brunettes.

A pale green, made of Indian yellow and cobalt blue, is sometimes used in shadows about the mouth.

Sepia or Van Dyke brown for brown hair.

Shade with sepia and carmine, and use cobalt blue mixed with burnt sienna for high lights.

Pale wash of cobalt blue on high lights of black hair, and shade with black and carmine.

Roman ochre for golden hair, with burnt sienna and cobalt blue in lights; shade with sepia and Roman ochre.

For gray hair mix a wash of cobalt blue and sepia; shadow with sepia; and sometimes use white mixed with local color for high lights.

Backgrounds.—For fair complexions or children should be blue, inclining to purple. Cobalt blue and burnt umber make very desirable backgrounds.

Olive grounds are used for dark or old complexions. Where the flesh tint is sallow, use warmer colors—green approaching to olive.

Grays produce a pleasing effect on fair complexions.

Never paint a bright blue ground and crimson curtains, but keep everything quiet and subdued.

Opaque backgrounds are far from artistic, and but seldom used.

Stippling.—Towards the end of your work you will observe many inequalities in the tints. These require to be filled up with the point of a brush with an assimilating color; and that filling up is termed stippling.

Draperies.—For black draperies, first use a local wash of ivory black; wash in the deep shadows with a mixture of crimson lake and sepia; then add another wash of black over the whole, touching in the shadows as before. Proceed in this way for two or three washes, and then touch in the high lights with light red and white.

PHOTOGRAPHS, To Dress for.—In dressing for photographs it is useful to know that dark-brown, dark-green, maroon, and plain black goods, without gloss, will take a rich drab color. Silks of the same color will take considerably lighter. Snuff-brown, dark-leather, dark-drab, scarlet, cherry, dark-orange, crimson, and slate will take a very rich drab color. Violet, blue, purple, pink, and magenta will take very light, and should be avoided.

PHOTOGRAPHIC COLLODION, Iodides for.—Iodide of ammonium, 90 grs.; iodide of cadmium, 90 grs.; bromide of ammonium, 40 grs.; alcohol (810), 10 oz.

Or, iodide of magnesium, 200 grs.; bromide of cadmium, 50 grs.; alcohol (810), 10 oz.

Pulverize the salts, and add gradually to the alcohol, commencing with the bromide; shake until completely dissolved, and set away in a dark place.

PHOTOGRAPHS, Enameling.—The beau-

tiful gloss called enameling is produced as follows: "After the prints have been toned and washed in the usual way, trim to the right size by means of a cutting shape; then immerse in a warm solution of gelatine (which must be kept, whilst operating, nearly as possible of an equal temperature) of about the same consistency as collodion. Care should be taken always to filter the solution before using. When thoroughly impregnated with the same, the prints are taken out and laid, face down, on collodionized glass plates (preparation of which is given below), care being taken that all air bubbles between the paper and glass are carefully pressed out and removed. Afterwards, a sheet of stout white paper, somewhat larger than the prints, is cemented to the back of each photograph—a precaution for protecting the pictures in the event of their spontaneously leaving the glass on drying. The plates are allowed to remain for ten or twelve hours (say over night) in a dry locality, and, at the end of that time, the portraits may be separated from the glass by making an incision of the film all round the paper. The superfluous paper should be trimmed off previously to the pictures being mounted upon the cards.

"Many of the manipulations may be slightly modified if desired; for instance, instead of cementing a piece of paper to the back of the prints, the card itself, if not very thick, may be at once attached, the margin of which will be gelatinized in the same way as the picture. Some photographers add a small quantity of sugar candy to the gelatine in order to prevent the sizing solution drying too rapidly, and to render the finished card more plastic and impressionable to the cameo embossing press, which apparatus gives to these pictures a most beautiful and pleasing effect.—

To Prepare the Collodionized Plate.—Glass plates of a suitable size, say, $8\frac{1}{2}$ by $6\frac{1}{2}$ or 10 by 8, and which have been carefully cleaned, as if to serve for taking negatives upon, are rubbed over with finely powdered pumice stone or Tripoli powder, which is afterwards thoroughly removed by means of a soft dusting brush. The plates are then coated with a four per cent. normal solution of collodion, and placed to dry in a spot free from dust; they are then ready for use."

PHOTO-GALVANOGRAPHY, Pretsch's Process.—Take a plate of glass, and spread on it ordinary glue, to which bichromate of potash and a small quantity of nitrate of silver have been added. For instance, take 2 or 3 solutions of glue, into one of which put a little nitrate of silver, into another bichromate of potash, and into another iodide of potassium. The silver and the iodide are for the purpose of producing a little iodide of silver on the sensitive film, so as to produce on the picture that grain which is necessary for holding the ink in the process of printing. Take the photographic picture obtained by any of the customary processes, and place it on the sensitive plate thus prepared and exposed to the action of the light. In the course of a short time (all those parts which are dark in the photograph, protecting the plate from change, and all those which are white, allowing the sunlight freely to pass through and the change to take place), we have a combination of bichromate of potash and gelatine in two different states, one soluble and the other insoluble. Consequently, when the plate is then put into water all the parts which remain soluble are dissolved out, whilst

the other parts remain as they were, and we have the picture produced not only in different lights and shades, but also in different depths, the solution being eaten into by the process. When the plate is prepared to this point, there is poured upon it a preparation of gutta serena, which, being kept under pressure for a short time, receives the reverse image of the photographic picture. This is now prepared for the voltaic battery by being simply rubbed over with fine black lead, and it being placed in connection with the trough, copper is precipitated on the plate, which receives an image the reverse of the mould. Then by the ordinary electrotype process another plate may be obtained, from which copies may be printed.

PHOTOGRAPHIC LIGHT.—The lights intense enough to make photographs are: 1. sun and daylight; 2. the electric light; 3. the magnesium light; 4. the lime light, produced by the hydro-oxygen blow-pipe; 5. the light produced by the burning of a cylinder of carbonate of magnesia, mixed with titanite acid.

PHOTOGRAPHERS, New Light for.—Photographers have long been seeking for an artificial light, so readily available that the success of their manipulations may not be wholly dependent on the sun, and subject to the caprice of the clouds. The last attempt to find the much needed substitute is by digesting zinc in the iodide of ethyl, a process which yields a liquid substance inflammable by the mere contact of the oxygen in the air. By passing pure hydrogen (or perhaps ordinary illuminating gas) through the fluid, the compound of zinc and ethyl will volatilize into the gas, and will yield, on combustion, a flame of extraordinary brilliancy and vivid whiteness of color.

It is said that the actinic effects of this light are inferior to those of combusted magnesium; but the steadiness of a flame from a gas will so far surpass any that can be obtained from a burning metal, even when the latter is of the highest purity chemically obtainable, that most photographers will doubtless give it the preference.

PHOTOGRAPHIC PRINTING.—Sensitive papers ought not to be exposed in the frame until they are quite dry. The shutter at the back of the frame is removed, and the negative laid flat upon the glass, collodion-side uppermost. A sheet of sensitive paper is then placed upon the negative, sensitive-side downwards; next comes a layer of thick felt; and the whole is then tightly compressed by replacing and bolting down the shutter. The amount of pressure required is not very considerable, but if the springs of the frame become too weak after a time, a few pieces of mill-board may be placed beneath them. The time of exposure to light varies much with the density of the negative and the power of the actinic rays, as influenced by the season of the year and weather. If the exposure to light has been correct the print appears slightly darker than it is intended to remain. The toning bath dissolves away the lighter shades, and reduces the intensity, for which allowance is made in the exposure to light. A little experience soon teaches the proper point; but much will depend upon the state of the toning bath, and albumenized paper will require to be printed somewhat more deeply than plain paper. If, on removal from the printing-frame, a peculiar spotted appearance is seen, produced by unequal

darkening of the chloride of silver, either the nitrate bath is too weak, the sheet removed from its surface too speedily, or the paper is of inferior quality. If, in the exposure to ordinary diffused daylight, the shadows of the proof become very decidedly coppery before the lights are sufficiently printed, the negative is in fault. Ammonio-nitrate paper highly salted is particularly liable to this excess of reduction, and especially so if the light is powerful. — *Toning.* The print should be first washed in common water until the soluble nitrate of silver is removed. This is known to be the case when the liquid flows away clear; the first milkiness being caused by the soluble carbonates and chlorides in the water precipitating the nitrate of silver. Ten minutes in water running slowly from a tap will be sufficient to cleanse a print from nitrate of silver; or three or four changes in a dish, pouring off quite dry between each change. It is an advantage to finish off with a solution of salt (2 grs. to the oz.) Pour the tonic bath out into a flat dish, and put the prints into it 2 or 3 at a time, waving the dish meanwhile backwards and forwards to secure a constant movement. Continue to keep the prints moving, and watch the changes in color. If the prints are removed as soon as the blue color of the gold is seen, they will usually change in the fixing bath to a warm shade of brown; but when left for 2 or 3 minutes longer in the toning bath, the darker tint becomes permanent. — *Fixing.* One oz. of hyposulphite of soda dissolved in 6 ozs. of water would fix two batches of stereoscopic prints, 20 in each batch. Allow the prints to remain in the fixing baths for 20 minutes, with occasional movement, after which they may be transferred to a dish of clean water. — *Washing.* It is essential to wash out every trace of hyposulphite of soda from the print, if it is to be preserved from fading, and to do this properly requires care. Always wash with running water when it can be obtained, and choose a large shallow vessel exposing a considerable surface in preference to one of lesser diameter. A constant dribbling of water must be maintained for 4 or 5 hours, and the prints should not lie together too closely, or the water will not find its way between them. When the prints have been thoroughly washed, blot them off between sheets of porous paper and hang them up to dry. — *Mounting.* Mount the proofs with a solution of gelatine in hot water, freshly made; gum-water, prepared from the finest commercial gum, and free from acidity, may also be used, but it should be made very thick, so as not to sink into the paper, or produce "cockling up" of the cardboard on drying. — *Positive Printing by Development.* Negative printing processes will be found useful during the dull winter months, and at other times when the light is feeble, or where it is required to produce a large number of impressions from a negative in a short space of time. The proofs, however, as thus obtained, are not equal to direct sun-prints in beauty and gradation of tone. Take of iodide of potassium, 120 grs.; bromide of ammonium, 30 grs.; water, 20 ozs. Float the paper on the iodizing bath until it ceases to curl up, and lies flat upon the liquid; then pin up to dry in the usual way. Render sensitive upon a bath of aceto-nitrate of silver, containing 30 grs. of nitrate of silver with 30 minims of glacial acetic acid to each oz. of water. Place the dried sheets in contact with

the negative in a pressure frame, and expose to a feeble light. About 30 seconds will be an average time upon a dull winter's day, when it would be impossible to print in the ordinary way. Develop by immersion in a saturated solution of gallic acid. After the picture is fully brought out, wash in cold and subsequently in warm water, to remove the gallic acid, which, if allowed to remain, would discolor the hyposulphite bath. Fix the print in a solution of hyposulphite of soda, one part to two of water, continuing the action until the yellow color of the iodide disappears. Wash thoroughly in plenty of water.

PHOTOGRAPHIC PROCESS, Improved. — The collodio-bromide emulsion must contain an excess of nitrate of silver. All the soluble bromide in the collodion must be converted, and there must remain as large an excess of nitrate of silver as the collodion will contain. About six grains of bromide of cadmium and eleven grains of nitrate of silver to the ounce of emulsion will not be found bad proportion.

When all the materials used in the collodion are of the best quality, so that the emulsion is neutral or nearly so, one or two minims of glacial acetic acid to the ounce may be added with advantage; otherwise no addition of acid is necessary. There need not be more acid in the sensitive film than there is in an ordinary wet collodion film.

The plate is to be coated with the emulsion in the usual way, and then put into the dark slide or plate box until required for the exposure.

Under the best conditions of the film—that is to say, when it contains the minimum of free acid and the maximum of free nitrate—the sensitiveness will be about the same as that of good wet collodion.

The image is to be developed with a common acid iron developer, rather strong, and containing as much alcohol as is found necessary to enable it to flow properly over the dry film. This quantity will, of course, be greater than that which is commonly added to the developer in the wet process.

The image comes out very quickly and must now be treated in the usual way as regards intensifying and fixing. The negative is indistinguishable, when finished, from a common wet collodion one.

This process offers great advantages to the tourist, because it requires no nitrate bath, no troublesome washing of the plate, no preservative, no subsequent drying, and no wetting of the plate before development. The emulsion may be kept in two separate parts—one consisting of the collodion with the bromide of cadmium, the other being an alcoholic solution of nitrate of silver; these may be mixed as required for use. The film adheres well to the glass without any preliminary coating, and there are no troubles with blisters, or wrinkling, or tearing of the film.

PHOTOGRAPHIC PAPER PROCESS. — A good sheet of Turner's paper is selected, and washed with the following solution:—nitrate of silver, 17 grains; distilled water, 1 oz.; dry the paper, and wash with iodide of potassium, 400 grains; common salt, 100 grains; pure water, 1 pint; when partially dried, the prepared side must be cleared of the potash by floating it on water for five to ten minutes, then dry it. Now prepare a solution of nitrate of silver, 25

grains; glacial acetic acid, 1 drachm; distilled water, 1 oz.; add to some of this an equal quantity of a solution of crystallized gallic acid in cold distilled water, and the gallo-nitrate of silver thus formed is applied to the paper, which is then ready for use, after rinsing in clean water. The gallic acid solution and the gallo-nitrate of silver will not keep long, and should only be made when required. After exposure in the camera, the gallo-nitrate is again applied to develop the picture, which is then washed, and fixed with the solution of hyposulphate of soda.

PHOTO-LITHOGRAPHIC PROCESS, Osborne's patent.—Let us suppose that a map has been compiled and drawn with great care, and that it is desired to multiply copies of this original in the lithographic process. The first step in the process is to obtain a negative; for which purpose the map is placed upright upon a plane-board, and the camera opposite to it at such a distance as to give the desired ratio between original and copy. A negative is now taken on glass coated with collodion in the usual way, observing the greatest care to avoid distortion of all kinds, and to produce a negative of the highest excellence, success in which depends entirely upon the knowledge, judgment and experience of the operator. A sheet of plain, positive photographic paper is now coated on one side with a mixture, consisting of gelatine, softened and dissolved in water, to which a quantity of bichromate of potash and albumen has been added. The paper, evenly covered with this fluid, is dried in the dark, when it will be found possessed of a smooth glassy surface, and a bright yellow color. This surface is still further improved by passing it through the press in contact with a polished plate.

A suitable piece of positive photo-lithographic paper thus manufactured is now to be exposed to the action of the light under the negative of the map already described. This is accomplished in an ordinary pressure frame, the time required varying from 10 to 15 seconds, or several minutes, according to the brightness of the weather. The positive thus obtained presents itself to the eye as a brown drawing upon the clear yellow of the sheet.

The exposed photographic copy of the original is covered all over, while dry, with transfer-ink, which is accomplished by running it through the press with its face in contact with a stone which has already received a coating of such ink. After it is separated from the blackened stone it will be found to have brought away with it an evenly distributed film of inky matter, forced by the pressure into intimate contact with the unexposed, as well as the exposed portion of the surface. This operation is known as "blackening" the positive print; that now to be described is called "coagulation," its object being to effect a change of that nature upon the albumen contained in the coating of the organic matter. For this purpose moisture and heat are necessary, and both are applied very simply, by letting the blackened photographic copy swim upon the surface of boiling water with its inky side upwards, for it is important not to wet that with hot water. After the lapse of a certain period, determined by the experience of the operator, he proceeds to the next step in the process, that of "washing off." For this purpose the print is laid upon a smooth surface, such as a plate of glass or porcelain, and friction with a wet

sponge, or other suitable material, is applied to the black inky coating, under which the photographic image still exists, and to develop which is now the object in view. The operator soon becomes aware that the moisture which percolated through the paper from the back, has exerted a softened or gelatinizing influence upon the gelatine in the sensitive coating; it has caused it to swell, and to let go its hold upon the ink. But this change does not extend to those parts of the coating which were acted on by light; in other words, to those places which were unprotected by the opacity of the negative; they remain intact, uninfluenced by the solvent or moistening effect of the water. Accordingly the operator finds a fac-simile of the original map gradually develop under his hand as he continues the friction. This process is proceeded with until all traces of ink are removed, save those required to form the picture, which must be clear and distinct in all its details. Abundance of hot water is then poured over it, so as to remove every particle of soluble matter, and it is then finally dried, which completes its preparation.

A stone to which a fine smooth surface has been imparted, is now slightly warmed, and put in the lithographic press; upon this is placed (inverted) the positive print, after it has been damped by lying between moist paper, and the whole is then passed repeatedly through the press. On examination the paper will now be found to have attached itself firmly to the stone, so that some force is required to separate the two. When the former is removed it brings with it its albuminous coating, which gives to it while damp a parchment-like appearance; but the ink is gone: it has left the paper for the stone, and on the latter we find a reversed drawing of the map, one which, after it has been properly "prepared," will print as well as if it had been drawn by hand.

PHOTOGRAPHIC RELIEF PRINTING.—There are now in use two principal methods of printing pictures from a negative, called the silver print and the carbon print. The former produces the common photograph, and is founded on the same principle as the daguerreotype, namely, the decomposition by light of a silver compound. In the photograph this is usually the chloride, while in the daguerreotype the iodide and bromide are decomposed. The carbon print is based on an entirely different principle. Its invention arose from the incidental discovery that when a solution of bichromate of potash is mixed with a solution of glue, and the mixture dried, it becomes insoluble in water when exposed to light, but remains soluble if kept in the dark. This effect of light to make the so-called bichromate of gelatine insoluble depends on the strength of the light and the time of exposure; and penetrates more or less into the gelatinous layer according to these conditions. Hence, if such a solution is mixed with fine lampblack and an appropriate kind of paper coated with it, it may be washed off again if the paper is kept in the dark, but can not be washed off after the paper has been exposed to strong light; and it can be only partially washed off after exposure to weak light. It is evident that when paper thus prepared is exposed under a negative for a proper length of time, (which, by the way, is very short, as the substance is highly sensitive,) the parts protected from light by the details of the negative will become insoluble to various depths, according to

the degree of protection; and by washing away the soluble portions the picture will be brought out.

At the same time such a picture will have a relief. The dark portions will be elevated; the lighter parts, being more or less washed away, will be deeper. If we wish simply a relief, and not a picture, we may leave the black pigment out; take only a dry, thick coat of bichromate of gelatine, expose under the negative, and wash with warm water. Now, gelatine or glue, when thoroughly dry, is exceedingly hard, almost like glass, resisting pressure even better than glass. Such a gelatine-relief may, therefore, be placed on the steel plate of a hydraulic press, a sheet of clean lead laid on it, and the two brought together under from ten to twenty thousand pounds of pressure for every square inch of the surface of the picture. In this way a reverse or mould is obtained impressed in the lead plate, in which the parts to be darkest are the deepest, and vice versa. From such a gelatine-relief, handled with proper care, as many as twenty metallic lead plates may be obtained, each capable of producing about a thousand impressions, so that one negative may produce twenty thousand prints, all perfect and all alike. The prints are obtained by laying the lead mould on the warm, flat surface of a peculiar press made for the purpose, then taking a warm, semi-transparent mixture of color and gelatine, and pouring it in a little pool near the middle of the plate, laying the paper on this, and then applying the proper pressure. The mixture oozes out in all directions, after having filled all the hollows of the mould. After a few seconds, the pressure is removed and the paper taken up, when it is found that the mixture leaves the hollows in the lead mould entirely and adheres to the paper in exactly the same way as printing-ink adheres to the paper when the latter is removed from an engraved plate. The paper then has the picture adhering to it. This, however, is still soluble in water, and could be washed off; but by immersing it in a solution of alum, the gelatine or glue becomes utterly insoluble, even in boiling water, and we have a permanent finished print.

It is evident that any color can be used. Black with a brown tone is always the finest, and is preferred by artists; blue toned blacks are fine for certain styles of subjects, as are also violet blacks. Of other colors, dark red, or brown and dark blue, are the only ones which give satisfaction; their effect, however, is always inferior to that of the warm brown black, which gives the very tone obtained in the best silver prints, treated with a gold solution.

PHOTOGRAPHIC SEALS.—A photographer in Freiberg has made seals and stamps with the portraits of his customers. A thin layer of gelatine sensitized with bichromate of potash is exposed to the action of light under a photographic positive, by which the parts acted upon are rendered insoluble in water. The gelatine film is immersed in water, and the parts not acted upon by light swell up, and we obtain a picture in relief, of which a plaster cast can be taken. An electrotype copy being taken of the cast, we have a metallic fac-simile of the photograph, which can be employed as a seal. This is essentially an application of the photographic process, and suggests an excellent method for obtaining perfect likenesses of persons in metallic

casts for the use of the printer, as well as an admirable way of illustrating scientific books.

PHOTOGRAPHING ON WOOD.—Soon after the invention of photography, efforts were made to transfer photographs to blocks of wood, and to engrave them afterwards like ordinary cuts. The advantage of this process is two-fold: first, it is not necessary to make the drawing; and secondly, the photographic image is a much better copy than any hand-drawing, especially if the copy is to be reduced in size. In regard to the process of transferring, it has not as yet met with any great difficulties, although images could not be very well fixed, and were liable to become too dark. A further and more serious inconvenience made itself apparent in the old process of preparation. The block became so much softened and impregnated with salts that the artist was unable to execute his work with ordinary facility; in a word, the wood became fibrous and not capable of being well cut. At a more recent date, the attempt was made to paste a skin of collodion with the photograph on the block, and then to cut it. It happened, however, that the skin would become partially loosened, which made this method completely useless.

The difficult problem has finally been solved by Mr. Leth, in Leipzig, whose method is in detail as follows: In order to preserve the wood from the penetration of water, during the subsequent operations, the wood block is coated on its reverse and on its four edges with varnish or wax. After this, the perfectly polished cutting surface is grounded in the ordinary manner. Wood-cutters generally use for this purpose white lead, zinc white, or blanc fixe, with gum water; but for the purpose under consideration glue water is sufficient. The grounding is accomplished by means of rubbing with the finger and the ball of the hand until the surface is uniformly white and dry. This surface is hereupon immersed in a somewhat concentrated solution of alum, which will coagulate the glue, the superfluous liquid being thrown off by swinging the block about. The block is then allowed to dry. The photographic image is not produced on the wood block, but on a glass plate which is coated with a solution of bichromate of potash mixed with gum and honey.

By laying upon the latter a positive photographic copy of an image, and subjecting it to the action of light, an indistinct picture is obtained, but by spreading burned soot or another dust color upon it, it appears perfect; and if a proper shade has been selected, can scarcely be distinguished from an ordinary photograph. The parts of the chrome salt solution which have been affected by the light fail to take the dust-colors, while they adhere on the parts which have been protected against the action of the light, and thus the image is brought out. The latter is now to be transferred upon the wood block. This is done by coating the picture with collodion, and after that putting it into dilute nitric acid. Thereby the chrome salt is decomposed and the still soluble gum washed off, while the dust colors remain on the collodion. The cohesion between the collodion skin and the glass is at the same time removed. If the glass is immersed in a large vessel with sugar water, the skin may be easily removed by the fingers. The skin now floats in the sugar water. It is made to cover the wood block by immersing the

latter in the water, so that its prepared surface comes just below the floating collodion skin. When the latter lies without folds or bubbles in the proper position on the prepared wood surface, the block is withdrawn from the water and placed on edge for drying. In order to dissolve and separate the collodion skin, the surface of the picture is now sprinkled with ether. The dust colors, which represent the image, however, remain upon the ground surface, and after the ether has evaporated, the block is ready for cutting. In regard to the shade, it does not depend upon the chemical process, but upon the dust powder itself, which may be taken of any tint. Any picture taken from nature may be transferred in this manner, and if engraved, will show a similarity to the original not easily attainable.

PHOTOGRAPHING ON WOOD, Scaring's Process of.—The block on which the picture is to be made is first dampened with water, then whitened with enamel rubbed from the surface of good enameled visiting cards. Rub gently, removing only the enamel, after which it is brushed smooth with a moderately stiff brush, from right to left and up and down, making a smooth, even, and very thin surface. Allow this to dry, after which it is flowed with a solution of albumen, made with the white of one egg and sixteen ounces of water, dried by heat or allowed to dry spontaneously. Now coat it with another albumen solution made as follows:—1. White of one egg; water, 4 ounces; chloride of ammonia, 40 grains. Beat the whole to a thick froth. Allow to subside, then decant or filter through a fine sponge placed in a glass funnel. Pour a sufficient quantity on one corner of the block to cover it, when spread around with the aid of a 1-g or 1-6 glass (using the edge). Allow the surplus solution to drain back into the bottle. Dry this by a gentle heat.—2. Ether, 1 oz.; alcohol, 1 oz.; gun-cotton, 8 grs.; nitrate of silver, 30 grs.; dissolve in as small a quantity of water as possible, and allow to settle for a few days, protected from the light. Flow the salted block with formula No. 2, in the dark room, and dry by gentle heat. It is now ready for exposure under the negative. A porcelain printing frame, or any other suitable method, may be used to print it. After printing, formula 2 is removed from the surface of the block by dissolving in ether and alcohol, assisted by rubbing gently with a soft sponge. The picture can now be toned and fixed in the ordinary way, or fixed and toned at one operation, by the hypo and gold bath. After being allowed to dry, it is ready for the engraver.

SILVER (Waste), To Recover.—Dr. Gräger has proposed a new method for the regeneration of waste nitrate of silver solutions used in photography. After first referring to the generally applied and well known means now in use for this purpose, the author states that the best plan to treat these solutions is the following: They are boiled either in a porcelain basin or a glass flask, and while boiling, there is added to them recently precipitated, well washed, and moist oxide of silver; the boiling being continued for some time. The liquid is next filtered, and then evaporated to dryness, the heat being increased to fusion, so as to destroy ammoniacal salts; the residue is pure nitrate of silver. The sediment on the filter contains some oxide of silver, which must be added in excess; and, therefore, in order not to lose that, the filter is preserved, and the con-

tents worked up at a subsequent operation. The nitrate of silver thus obtained is, by practical photographers, pronounced to be of excellent quality.

SILVER STAINS, To Remove.—Put half a pound of Glauber salts, quarter of a pound of the chloride of lime, and eight ounces of water, into a little wide mouthed bottle, and when required for use pour some of the thick sediment into a saucer, and rub it well over the hands with pumice stone or a nail brush, and it will clean the fingers quite equal to cyanide, but without any danger. This will do to use over again until exhausted and should be kept corked up. The disagreeable smell may be entirely avoided by the liberal use of lemon juice, which not only entirely removes the smell, but whitens the hands.

SOLUTIONS, FIXING.—For positives: Cyanide of potassium, 120 grs.; nitrate of silver, 6 grs.; water, 10 ozs. When this solution requires more than a minute or two to clear the picture, add a small amount of cyanide of potassium.

This solution is highly poisonous, and should not be allowed to touch unsound skin, nor should the fumes be breathed.

For negatives: The above solution of cyanide of potassium answers very well, or hyposulphite of soda, 10 ozs.; water, 10 ozs.; ether, 30 minims.

SOLUTION OF SILK in Photography.—Pure silk is soluble in hydrochloric acid, and if the solution be neutralized by ammonia, and evaporated, an organic chloride of ammonium results, which is capable of use in photography, particularly for salting paper. Paper thus prepared is said to be more sensitive than that salted in the usual way, and in printing, gives a warmer tone. It is thought that this salt could also be used in the preparation of collodio-chloride of silver, if it were sufficiently soluble in alcohol.

STEREOSCOPIC PICTURES.—Photographs for the refracting stereoscope are taken with small lenses of about $4\frac{1}{2}$ inches focus. For portraits a camera may advantageously be fitted with two double combination lenses, of $1\frac{3}{4}$ inches diameter, exactly equal in focal length and in rapidity of action. The caps are removed simultaneously, and the pictures impressed at the same instant. The centers of the lenses may be separated by 3 inches, when the camera is placed at about 6 or 8 feet from the sitter. Pictures taken with binocular camera of this kind require to be mounted in a reversed position to that which they occupy on the glass, or a pseudoscopic effect will be produced. The negatives may be cut in half, the right half being printed on the left side, or the finished prints may be removed before mounting.

STEREOSCOPIC TRANSPARENCIES.—Sensitive films prepared by Russell's Tannin Process. Place the negative and the prepared plate in contact, and squeeze them together in an ordinary pressure frame; not too strongly, however, or it will probably be found, after throwing off a few impressions, that the negative has been scratched. Lay a strip of black velvet behind the sensitive film to absorb stray light.

TAPIOCA PAPER in Photography.—A substance called tapioca paper—recommended as very useful in taking photographs by artificial light—is prepared by soaking 300 grains of tapioca for two days in an equal weight of water, then adding a quart of water; and afterward for

every tenth of a quart of the liquid fifteen grains of iodide of potassium, forty-five grains of chloride of potassium, and one and a half grains of bromide of potassium are to be introduced, and, when dissolved, the whole boiled for ten minutes, allowed to stand for a day, and then decanted and filtered through linen. Twelve to twenty sheets of the paper are immersed in this liquid at a time, or can be floated upon it for fifteen or twenty minutes, and then hung up to dry in a dark room. Should the paper assume a dark color it will be of no consequence, since this tint will disappear in the silver bath. This bath is to be prepared in the proportion of 1 to 15, and for every ounce of nitrate of silver fifty or sixty grains of citric acid are to be added. The developer is made of fifty grains of pyrogallic acid and eighty grains of citric acid in thirty ounces of water. The time of exposure varies from ten seconds to twenty-five minutes, according to the picture to be copied and the actinic force of the light.

TINTING Photographs slightly.—Having prepared the photograph in the usual way, take a little pink madder or carmine, and lay it on the cheek with a clean pencil. Soften it carefully all round the edges, blending the tint into the face. Repeat the process once and again, until you have obtained nearly as much color as necessary; I say nearly as much, because you have to pass the general flesh wash over it, which has the effect of darkening it considerably. For the purpose of softening, it will be as well to have two pencils on one holder. It might appear that putting on the color of the cheek at once, and softening it, would suffice; but you will get it far softer by doing it with a very pale tint two or three times, than you possibly can by making it at once as powerful as necessary; besides, it is impossible to soften a strong color so well as a pale tint. When the color is quite dry, go over the whole of the face with a flesh tint, then put in the hair, eyes, eyebrows, and lips; round off the forehead with gray, and apply the same to those parts of the face where you observe it to be in nature. If your photograph be a very dark one, you will not require so much gray in it as if it were a light impression. Next wash in the background and proceed with the draperies, etc.

Return now to the face: strengthen the carnations, grays, and shadows, by hatching delicate tints over them; put the light in the eyes, and the spirited touches about it, and the eyebrows, mouth, etc., and finish off the hair. In dark photographs, you will require to lay the lights on the hair with body color, as it is generally much darker than it appears in nature. Make out the linen with a gray, deepening it in the darkest parts, and lay on the high lights with constant or Chinese white. Proceed next to shadow the drapery, and when you have obtained the required depth, scumble in the high lights, using a bare pencil and a very gentle hand, as before directed. Give the background another wash, if requisite, and your photograph is finished; or make up a tint of orange vermilion and white, according to the complexion, and lay it smoothly over face and hands; then put on the carnations with rose madder, and shadow up the face with orange tint, and proceed as above to finish. If the backgrounds and draperies appear dead, you may take a piece of very soft washing silk and rub them up a little, which will have the

same effect as if they had been hot-pressed. Whenever body color has been used, the rubbing will be ineffective. Neither rubbing nor hot pressing will give a shine to any but transparent tints. If there be metal buttons, chains, or epaulettes, they must be laid over the dress with body colors; a very good ground for them is red chrome and gamboge, shadowed with burnt umber, and lightened on the lights with lemon chrome and Chinese white. By the foregoing methods, it will be unnecessary to hatch or stipple a great deal; for you will find that the face will come out very soft and round without it, but the effect is far inferior to that produced by the other process.

TRAYS of Papier Mache.—There is no reason why dishes, trays, pails, bottles and other utensils for photographers' use should not be made of papier mache. This material is not liable to shrink or break. It is very light, unacted upon by acids, impervious to water, unaffected by silver, and is in every way preferable to ordinary porcelain. The difference in cost as compared with porcelain is now quite trifling.

VARNISH for Colored Drawings.—Take of Canada balsam, 1 oz.; spirit of turpentine, 2 ozs. Mix them together. Before this composition is applied, the drawing or print should be sized with a solution of isinglass in water; and when dry apply the varnish with a camel's hair brush.

VARNISH (Camphorated Mastic) for Paintings.—Take of mastic cleaned and washed, 12 oz.; pure turpentine, 1½ oz.; camphor, ½ oz.; white glass pounded, 5 oz.; essence of turpentine, 36 oz. Make the varnish according to the method indicated for Compound Mastic Varnish. The camphor is employed in pieces, and the turpentine is added when the solution of the resin is completed. But if the varnish is to be applied to old paintings, or paintings which have been already varnished, the turpentine may be suppressed; as this ingredient is here recommended only in cases of a first application to new paintings, and just freed from white-of-egg varnish.

The question by able masters respecting the kind of varnish proper to be employed for paintings, has never yet been determined. Some artists who have paid particular attention to this subject, make a mystery of the means they employ to obtain the desired effect. The real end may be accomplished by giving to the varnish destined for painting, pliability and softness, without being too solicitous in regard to what may add to its consistence or its solidity. The latter quality is particularly requisite in varnishes which are to be applied to articles much exposed to friction; such as boxes, furniture, etc.

VARNISH, Etching.—1. Take of virgin wax and asphaltum, each 2 oz.; of black pitch and Burgundy pitch, each ½ oz.; melt the wax and pitch in a new earthenware glazed pot, and add to them, by degrees, the asphaltum, finely powdered. Let the whole boil, simmering gradually, till such time as that, taking a drop upon a plate, it will break when it is cold, on bending it double two or three times betwixt the fingers. The varnish, being then boiled enough, must be taken off the fire, and, after it cools a little, must be poured into warm water that it may work the more easily with the hands, so as to be formed into balls, which must be kneaded, and put into a piece of taffety for use.—2. White wax, 2 oz.; black and Burgundy pitch, of each ½ oz.; melt

together, add by degrees powdered asphaltum, 2 oz., and boil till a drop taken out on a plate will break when cold by being bent double 2 or 3 times between the fingers; it must then be poured into warm water and made into small balls for use.

WASHING SODA, *Improved substitute for*.—It has been found that the hyposulphite of soda,

which is now manufactured very cheaply, for the use of photographers, is much better than the common washing soda to wash delicate objects. It attacks neither the skin of the hands nor the objects to be washed, as does the common soda; and at the same time it is an effective bleaching agent, and takes out many spots better than any other substance.

PRESERVING AND STORING.

ANCHOVIES, *English*.—Sprats, 1 bushel; salt, 7 pounds; saltpetre, 3 pounds; prunella, $\frac{1}{4}$ pound; cochineal to color slightly. Pound in a mortar, then put into a stone pan or empty anchovy barrel, first a layer of sprats, then one of the composition, then a layer of sprats, and so on, until it is filled. Press down tight, and keep them for six months.

APPLE BUTTER.—Select two bushels of sour apples, and peel, core and quarter them. Take a barrel of good sweet apple cider, and boil it in a copper kettle until all the impurities have risen to the surface. After this is done, and the impurities skimmed off, take out two thirds of the cider. Then put in the apples, and as the quantity boils down put in the rest of the cider. After putting in the apples the butter must be stirred without interruption until it is taken off. It will take about five hours boiling after the apples are put into the cider. It should be boiled until the whole mass becomes smooth and of the same consistency, and of a dark brown color. Spice with ground cloves and cinnamon, to taste. The butter can then be taken off and put into vessels for use. Earthen crocks are best for this purpose. Tie the vessels over with heavy paper and set them away in a dry place. The butter will keep a year if wanted.

APPLE BUTTER, (*Pennsylvania method*).—Boil new cider down to one half. Pare, cut, and core equal quantities of sweet and sour apples. Put the sweet apples in a large kettle to soften a little first, as they are the hardest. Add enough boiled cider to cook them. After boiling half an hour, stirring often, put in the sour apples, and add more boiled cider with molasses enough to sweeten moderately. Boil until tender, stirring to prevent burning. Pack in firkins or stone pots for winter use.

APPLES, *To Dry*.—The most general method adopted in drying apples is, after they are pared, to cut them in slices, and spread them on cloths, tables, or boards, and dry them out-doors. In clear and dry weather this is, perhaps, the most expeditious and best way; but in cloudy and stormy weather this way is attended with much inconvenience, and sometimes loss, in consequence of the apples rotting before they dry. To some extent they may be dried in this way in the house, though this is attended with much inconvenience. The best method that I have ever used to dry apples is to use frames. These combine the most advantages with the least inconvenience of any way, and can be used with equal advantage either in drying in the house or out in

the sun. In pleasant weather the frames can be set out-doors against the side of the building, or any other support, and nights, or cloudy and stormy days, they can be brought into the house, and set against the side of the room near the stove or fire-place. Frames are made in the following manner: Two strips of board, 7 feet long, 2 or 2 $\frac{1}{2}$ inches wide—two strips 3 feet long, 1 $\frac{1}{2}$ inches wide, the whole $\frac{3}{4}$ of an inch thick—nail the short strips across the ends of the long ones, and it makes a frame 7 by 3 feet, which is a convenient size for all purposes. On one of the long strips nails are driven 3 inches apart, extending from the top to the bottom. After the apples are pared, they are quartered and cored, and with a needle and twine, or stout thread strung into lengths long enough to reach twice across the frame; the ends of the twine are then tied together, and the strings hung on the nails across the frame. The apples will soon dry so that the strings can be doubled on the nails, and fresh ones put on or the whole of them removed, and others put in their place. As fast as the apples become sufficiently dry they can be taken from the strings, and the same strings used to dry more on. If large apples are used to dry, they can be cut in smaller pieces. Pears and quinces, and other fruits that can be strung, may be dried in this way.

APPLE JAM.—The apples, which should be ripe, and of the best eating sort, being pared and quartered, are put into a pan with just water to cover them, and boiled until they can be reduced to a mash. Then for each pound of the pared apples, a pound of sifted sugar is added, being sprinkled over the boiling mixture. Boil and stir it well, until reduced to a jam. Then put it into pots.

The above is the most simple way of making it; but to have it of the best possible clearness, make a thick syrup with three pounds of sugar to each pint of water, and clarify it with an egg, as before directed. Then add one pint of this syrup for every three pounds of apples, and boil the jam to a proper thickness.

APPLE JELLY.—Take any quantity of sound common apples, those with red skins make the brightest colored jelly; wash carefully, but do not peel them; fill a preserving-pan with the apples, and just cover them with water; boil till they are all in a pulp, then strain it through a hair sieve. To every pint of juice add one pound of white sugar, and a little essence of lemon; boil the whole till it is perfectly clear, and jellies when cold; it ought to turn out of a shape quite stiff and clear.

APPLE MARMALADE.—Peel and core two pounds sub-acid apples and put them in an enameled saucepan with one pint of sweet cider, or half a pint of pure wine, and one pound of crushed sugar, and cook them by a gentle heat three hours, or longer, until the fruit is very soft, and then squeeze it first through a colander and then through a sieve. If not sufficiently sweet, add powdered sugar to suit your taste, and put away in jars made air-tight by a piece of wet bladder.

APPLES, Preserving.—1. By selecting the best of fruit, and carefully enveloping each specimen separately in paper so that the air cannot pass through, the time of keeping in a sound and eatable condition can be greatly prolonged. After covering each apple with paper, select a light wooden box and cover it on the inside, or outside, with paper either before, or after putting in the fruit, as the case may be. Those persons who are desirous of preserving a small quantity of apples will be amply repaid for their trouble by trying the above experiment. The fruit should not be disturbed after packing until the box is opened at the time the fruit is to be eaten.—2. A layer of dry sawdust was sprinkled at the bottom of the box, and then a layer of apples placed in it so that they did not touch each other. Upon these were placed a little layer of sawdust, and so on until the box was filled. The boxes, after being packed in this way, were placed on the wall in the cellar, up from the ground, where they kept, perfectly retaining their freshness and flavor, until brought out.—3. Apples for keeping should be laid out on a dry floor for three weeks. They then may be packed away in layers, with dry straw between them. Each apple should be rubbed with a dry cloth as it is put away. They should be kept in a cool place, but should be sufficiently covered with straw to protect them from frost. They should be plucked on a dry day. They also keep if packed in dry sand.—4. An excellent method for preserving apples through the winter is to put them in barrels or boxes, surrounding each apple with some dry mould or gypsum (plaster of Paris)—not the calcined used for casts, models, etc.—and kept in a dry, cool outhouse.

APPLES (Crab), Preserving.—The fruit is prepared by first cutting out all decayed portions; then wash clean, and place in a kettle with sufficient water to cover the fruit entirely. Have a tight-fitting lid to the kettle and boil, over a moderate fire, until the fruit is soft enough to pierce with a straw; drain off the water, and strain through a coarse cloth or jelly bag, and set it aside for jelly. The apples, in boiling, will have burst their skins, which are easily removed; the cores are taken out by pushing them through from the blossom end, with a goose quill or a stick of equal thickness, being careful to press the stem end against the fingers to prevent breaking the apple. The fruit is now ready to preserve whole or to make into marmalade; for either, the proportions are; 4 lbs. of fruit, 3 lbs. of sugar, and 1 pint of water. Put the sugar and water into the preserving kettle, set it over the fire until it boils, then drop in the fruit, (if it is to be done whole), boil until clear, and remove into a jar. If there is more syrup than will be needed, boil down to the desired quantity; pour it over the fruit while hot, and cover with a cloth, cut of sufficient size to cover and tie down.

This cloth dip into a cement made of two parts of bees-wax to one of rosin, adding enough tallow or lard to keep it from cracking. While the whole is warm, draw the cloth tightly over the top of the jar and tie down. To make marmalade, the boiled fruit must be mashed to a pulp before being added to the syrup, and then boiled, and stirred until it becomes clear, which is usually in half an hour.

APPLE (Crab) Jam.—Pare the crab apples when quite ripe. Put them into a stone jar, cover it well, and put it in a pan of boiling water for an hour and a half. Then prepare the syrup with two pounds of sugar in half a pint of water, for every pound of the apples. Clarify the syrup. Then put the apples into it, and boil the whole to a jam.

APPLES (Pine), To Preserve.—Cut the pine-apples into slices about half an inch thick, put them into a jar, make a syrup, using half a pound of sugar to a pint of water, and let it simmer quietly till dissolved. Let it stand a day, and then pour it cold over the fruit; after a short time take it away, and let it simmer again, having added a little more sugar. Repeat this process three or four times, and the last time pour the syrup boiling over the fruit.

APRICOTS, Dried.—Thrust out the stones with a wooden skewer, then pare them and roll them in dry powdered lump sugar; afterwards put them into a cold syrup, made with 2 lbs. of lump sugar to $\frac{3}{4}$ of a pint of water, and heat them gradually nearly to the boiling point, turning them frequently. Then pour them into a deep dish, and next day scald them again, adding as much sugar as will dissolve; again let them rest until the next day, when they must be placed on a hair sieve to drain and dry.

The fruit should not be quite ripe. Sometimes the apricots are cut into halves or quarters before preserving, and at other times pickled with the skins on; in the latter case they are gathered sooner, and infused in cold water with some vine leaves; next taken out and gently immersed in fresh water until they turn yellow, and then rubbed with a flannel and some salt to remove the down; they are then again soaked in the pan with the vine leaves, until they turn greenish. The best are selected, rubbed dry, the stones extracted, and boiled in syrup as above described.

APRICOT JAM.—Let the fruit be just in maturity, but not over ripe. Remove the skins, then cut the apricots in halves. Crack the stones, take out the kernels, bleach them in boiling water, and then pound them in a mortar. Boil the broken stones, skins, and parings, in double the quantity of water required for the jam. Reduce it in the boiling to one half of its original quantity. Then strain it through a jelly bag. To each pound of prepared apricots put a quarter of a pint of this juice, a pound of sifted loaf sugar, and the pounded kernels. Put it on the fire, which should be brisk, and stir the whole with a wooden spoon until it is of a nice consistence, but without being very stiff, or it would have a bad flavor. Put it immediately into pots, and let these stand uncovered during twenty-four hours. Then strew a little sifted sugar over the upper surface of the jam in each pot, and tie egged paper over each pot.

APRICOT JELLY.—Pare the fruit thin, and stone it; weigh an equal quantity of sugar

in fine powder, and strew over it. Stand one day, then boil very gently till they are clear, move them into a bowl, and pour the liquor over. The next day pour the liquor to a quart of codling liquor; let it boil quickly till it will jelly; put the fruit into it, and boil; skim well, and put into small pots.

BACON.—The reputation of the Hampshire bacon is owing entirely to the care with which it is cured. The hogs, which are fattened on peas and barley meal, are kept fasting for twenty-four hours at least before they are killed; they are used as gently as possible in the act of killing, which is done by inserting a long-pointed knife into the main artery which comes from the heart. The hair is burnt off with lighted straw, and the dirty surface of the skin scraped off. The carcass is hung up after the entrails have been removed, and the next day, when the meat has become quite cold, it is cut up into flitches. The spare-ribs are taken out, and the bloody veins carefully removed; the whole is then covered with salt, with a small quantity of saltpetre mixed with it. Sometimes a little brown sugar is added, which gives a pleasant sweetness to the bacon. The flitches are laid on a low wooden table, which has a small raised border at the lower end. The table slants a little, so as to let the brine run off into a vessel placed under it, by a small opening in the border at the lower end.

The flitches are turned up and salted every day; those which were uppermost are put under, and in three weeks they are ready to be hung up to dry. Smoking the bacon is no longer as common as it used to be, as simply drying in the salt is found sufficient to make it keep. Those who from early association, like the flavor given by the smoke of wood burn sawdust and shavings in a smothered fire for some time under the flitches.

When they are quite dry they are placed on a board rack for the use of the family, or are packed with wheat chaff into chests till they are sold. The practice of cutting the hogs into pieces and pickling them in a vat, being attended with less trouble, is very generally preferred when there is only a sufficient number of hogs killed to serve the farmer's family; but flitches of bacon well cured are more profitable for sale. Corn-fed bacon is at least equal if not superior to the barley-fed, which is considered the prime article in England.

BEEF, To Cure.—Cut up the beef, and weigh and bulk it up, sprinkling a little salt over it, and let it lay ten or twelve hours, then pack it down in the barrel. To one hundred pounds of beef take one quart of salt, three and one half pints of molasses, one tablespoonful of saltpetre. Put all this into sufficient water to cover the beef; boil the pickle, and skim off all the scum, and when cold pour it over the beef, and weigh it down. Keep the beef covered with the pickle.

BEEF, DRY.—The good qualities of dried beef as an article of food for the family are not fully appreciated. In point of excellence it is one of the nicest articles, when properly prepared, that we have in our store-room. It is also one of the most economical articles of food; quite a small quantity of dried beef, shaved very fine, and cooked with a nice gravy, will serve for meat for a family at very small expense. Then it is so convenient to have; always ready; always

acceptable. To people who live convenient to market, it is not of so much importance; but to us, who live at a distance from towns, dried beef is one of the necessary articles in our bill of fare. We frequently entertain guests at our table who never have seen dried beef served other than as a relish for bread and butter, shaved and eaten without cooking. There are several methods of cooking it. Some prefer it cooked with a gravy of water, seasoned with butter, thickened with flour, and perhaps eggs broken in while cooking. Others cook it with crumbs of sausage, frying the sausage first, then adding the beef with water, and thickening with flour. It is also very good cooked with a little sweet milk and sweet cream, the gravy being thickened with flour; allow it to boil once; that is all the cooking it requires. A dish of dried beef, properly cooked, served with toast, baked potatoes, and boiled eggs, is a very nice provision for breakfast or a dinner prepared in haste. When too salt, it can be remedied by soaking, after cutting and before, and adding a little white sugar while cooking, to restore the sweetness lost by soaking. Sugar cured beef is much nicer than that cured with salt alone. I put mine into a sweet brine, such as is used for pork hams.

BEEF, PICKLED.—Rub each piece of beef very lightly with salt; let them lie singly on a tray or board for 24 hours, then wipe them very dry. Pack them closely in a tub, taking care that it is perfectly sweet and clean. Have the pickle ready, made thus: Boil four gallons of soft water with ten pounds of coarse salt, four ounces of saltpetre, and two pounds of coarse brown sugar; let it boil 15 minutes, and skim it while boiling very clean. When perfectly cold pour it on the beef, laying a weight on the top to keep the meat under the pickle. This quantity is sufficient for 100 lbs. of beef if closely packed.

BEANS, To keep Fresh for Winter.—Procure a wide mouthed stone jar, lay on the bottom of it some freshly pulled French beans, and over them put a layer of salt; fill the jar up in this manner with alternate layers of beans and salt. The beans need not all be put in at the same time, but they are better if the salt be put on while they are quite fresh. They will keep good all through the winter. When going to use them, steep for some hours in fresh cold water.

BLACKBERRY JAM.—Gather the fruit in dry weather; allow half a pound of good brown sugar to every pound of fruit; boil the whole together gently for an hour, or till the blackberries are soft, stirring and mashing them well. Preserve it like any other jam, and it will be found very useful in families, particularly for children—regulating their bowels, and enabling you to dispense with cathartics. It may be spread on bread, or on puddings, instead of butter; and even when the blackberries are bought, it is cheaper than butter. In the country, every family should preserve, at least, half a peck of blackberries.

BLACKBERRY SYRUP.—Take a sufficient quantity of ripe blackberries. Put them into a sieve placed over a large broad pan, and with a clean potato masher, or something of the sort, press out all the juice. Or having bruised them first, put the blackberries into a linen bag, and squeeze out all the juice into a vessel placed beneath. Measure it, and to every quart of the strained juice allow half a pound of powdered loaf sugar,

a heaped teaspoonful of powdered cinnamon, the same of powdered cloves, and a powdered nutmeg. Mix the spices with the juice and sugar, and boil all together in a porcelain kettle, skimming it well. When cold, stir into the above quantity half a pint of fourth proof brandy. Then bottle it for use. This is a good family medicine, and is beneficial in complaints incident to warm weather.

It should be administered at proper times (at proper intervals), from a teaspoonful to a wine-glassful, according to the age of the patient.

BOUQUET, To keep Bright and Fresh.—Sprinkle it lightly with fresh water, and put it in a vase containing soap-suds. Each morning take the bouquet out of the suds, and lay it sideways in clean water; keep it there a minute or two, then take it out and sprinkle the flowers lightly by the hand with water. Replace it in the suds, and it will bloom as when first gathered. Change the suds every three or four days.

BUTTER, To keep Sweet.—Simply put it in clean jars and cover with a strong brine. This will keep pure butter a year fresh and sweet, as we know by experience. It is almost equally good to put in oak casks headed tight. This is equivalent to canning fruit. The brine in the case of the jar acts as a heading, keeping the air out. But butter should be made well. Work out the buttermilk till you have only pure beads clear as water; but do not work so much as to break the grain.

BUTTER, To keep in Summer.—A simple mode of keeping butter in warm weather, where ice is not handy, is to invert a common flower pot over the butter, with some water in the dish in which the butter is laid. The orifice in the bottom may be corked or not. The porousness of the earthenware will keep the butter cool. It will be still cooler if the pot be wrapped with a wet cloth. Not the porosity of the earthenware, but the rapid abstraction of heat by external evaporation causes the butter to become hard.

CABBAGES, To Preserve in Winter.—Sink a barrel in the ground to within an inch or two of the top, cut off the heads and fill the barrel full, put on a board to keep out water, and that is all the covering that is needed.

CABBAGE, To Pickle.—Select firm, ripe heads, slice fine, place in jars, and cover with boiling water. When cold, drain and season with sliced horse-radish, salt, equal parts of black and red pepper, cinnamon and cloves. Pack in jars, cover with cold, strong vinegar, and in two days it is ready for use. This pickle will keep a year.

CABBAGE (Red) To Pickle.—Cut the red cabbage in thin slices, spread it on a sieve and sprinkle with salt. Let it drain for twenty-four hours, dry it, pack it in pickle jars, fill them with cold vinegar, put in spice to taste, and tie the jars up firmly with bladder. Open the jars in a few days, and if the cabbage has shrunk, fill up with vinegar.

CALVES' FEET JELLY.—Boil 2 calves' feet in one gallon of water till it comes to a quart, then strain it, and when it is cold, skim the fat entirely off, and take the jelly up clean; if there be any settling at the bottom, leave it. Put the jelly into a saucepan, with a pint of mountain wine, half a pound of loaf sugar, the juice of four large lemons, and the white of six eggs, beat up the whisk; mix all well together, set the saucepan upon a clear fire, and stir the jelly till it

boils. When it has boiled a few minutes, pour it through a flannel bag till it runs clear. Then have in readiness a large china basin, with some lemon-peel in it, cut as thin as possible, let the clear jelly run upon them while warm, and from these it will acquire both an amber color, and an agreeable flavor. Afterwards it may be poured into glasses.

CANNING FRUIT.—The principle should be understood, in order to work intelligently. The fruit is preserved by placing it in a vessel from which the external air is entirely excluded. This is effected by surrounding the fruit by liquid, and by the use of heat to rarify and expel the air that may be entangled in the fruit or lodged in its pores. The preservation does not depend upon sugar, though enough of this is used in the liquid which covers the fruit to make it palatable. The heat answers another purpose; it destroys the ferment which fruits naturally contain, and as long as they are kept from contact with the external air they do not decompose.

The vessels in which fruits are preserved are tin, glass, and earthenware. Tin is used at the factories where large quantities are put up for commerce, but is seldom used in families, as more skill in soldering is required than most persons possess. Besides, the tins are not generally safe to use more than once. Glass is the preferable material, as it is readily cleaned and allows the interior to be frequently inspected. Any kind of bottle or jar that has a mouth wide enough to admit the fruit and that can be securely stopped, positively air-tight—which is much closer than water-tight—will answer. Jars of various patterns and patents are made for the purpose, and are sold at the crockery and grocery stores. These have wide mouths, and a glass or metallic cap which is made to fit very tightly by an India-rubber ring between the metal and the glass. The devices for these caps are numerous, and much ingenuity is displayed in inventing them. We have used several patterns without much difference in success, but have found there was some difference in the facility with which the jars could be opened and closed. The best are those in which atmospheric pressure helps the sealing, and where the sole dependence is not upon screws or clamps. To test a jar, light a slip of paper and hold it within it. The heat of the flame will expand the air and drive out a portion of it. Now put on the cap; when the jar becomes cool the air within will contract, and the pressure of the external air should hold the cover on so firmly that it cannot be pulled off without first letting in air by pressing aside the rubber or by such other means as is provided in the construction of the jar. When regular fruit jars are not used, good corks and cement must be provided.

Cement is made by melting $1\frac{1}{4}$ oz. of tallow with 1 lb. rosin. The stiffness of the cement may be governed by the use of more or less tallow. After the jar is corked, tie a piece of stout drilling over the mouth. Dip the cloth on the mouth of the jar into the melted cement, rub the cement on the cloth with a stick to break up the bubbles, and leave a close covering.

The process. Everything should be in readiness, the jars clean, the covers well fitted, the fruit picked over or otherwise prepared, and cement and corks, if these are used, at hand. The bottles or jars are to receive a very hot liquid, and they must be gradually warmed beforehand,

by placing warm water in them, to which boiling water is gradually added. Commence by making a syrup in the proportion of a pound of white sugar to a pint of water, using less sugar if this quantity will make the fruit too sweet. When the syrup boils, add as much fruit as it will cover, let the fruit heat in the syrup gradually, and when it comes to a boil ladle it into the jars or bottles which have been warmed as above directed. Put in as much fruit as possible, and then add the syrup to fill up all the interstices among the fruit; then put on the cover or insert the stopper as soon as possible. Have a cloth at hand dampened in hot water to wipe the necks of the jars. When one lot has been bottled, proceed with more, adding more sugar and water if more syrup is required. Juicy fruits will diminish the syrup much less than others. When the bottles are cold, put them away in a cool, dry, and dark place. Do not tamper with the covers in any way. The bottles should be inspected every day for a week or so, in order to discover if any are imperfect. If fermentation has commenced, bubbles will be seen in the syrup, and the covers will be loosened. If taken at once, the contents may be saved by thoroughly reheating.—Another way is to prepare a syrup and allow it to cool. Place the fruit in the bottles, cover with the syrup and then set the bottles nearly up to their rims in a boiler of cold water. Some wooden slats should be placed at the bottom of the boiler to keep the bottles from contact with it. The water in the boiler is then heated and kept boiling until the fruit in the bottles is thoroughly heated through, when the covers are put on, and the bottles allowed to cool. It is claimed that the flavor of the fruit is better preserved in this way than by the other.

What may be Preserved.—All the fruits that are used in their fresh state or for pies, etc., and Rhubarb, or Pie-plant, and Tomatoes. Green Peas, and Corn, cannot be readily preserved in families, as they require special apparatus. Strawberries. Hard-fleshed sour varieties, such as the Wilson, are better than the more delicate kinds. Directions for these, as well as for Raspberries, will be found in a Basket item.

Currants need more sugar than the foregoing. Blackberries and Huckleberries are both very satisfactorily preserved, and make capital pies. Cherries and Plums need only picking over. Peaches need peeling and quartering. The skin may be removed from ripe peaches by scalding them in water or weak lye for a few seconds, and then transferring them to cold water. Some obtain a strong peach flavor by boiling a few peach meats in the syrup. We have had peaches keep three years, and were then better than those sold at the stores. Pears are pared and halved, or quartered, and the core removed. The best, high-flavored and melting varieties only should be used. Coarse baking pears are unsatisfactory. Apples. Very few put up these. Try some high-flavored ones, and you will be pleased with them. Quinces. There is a great contrast between quinces preserved in this way and those done up in the old way of pound for pound. They do not become hard, and they remain of a fine light color. Tomatoes require cooking longer than the fruits proper. See directions for these among Basket items. Any intelligent person who understands the principle upon which fruit is preserved in this way, will soon find the

mechanical part easy of execution and the results satisfactory.

CAULIFLOWER, To Keep.—They can be kept in a cellar by covering the roots and stalks with earth, till February. Or they may be placed in a trench in the garden, roots down, and covered with earth, up close to the heads; and then cover with hay, or straw, four or five inches thick, placing just enough soil on the straw to keep it in its position. This method does well in the latitude of New York; but in colder climates a thicker covering would be required.

CELERY, To Keep.—This may be kept in good condition through the winter in a cool, dry cellar, by having it set out in earth. When a small quantity only is wanted, take a box and stand the celery up in it, placing a little earth about the roots. The farmers who raise quantities of it often keep it in their old hot-beds, standing it up, and protecting it from frost. There is no vegetable more relished than this, and every person who has a garden should raise enough for his own use, if no more.

CHERRY CHEESE.—Take twelve pounds of juicy cherries, stone them, and boil them for two hours, till they become a little cloggy, but take care that they do not burn. Then add to them four pounds of fine sugar, and boil another hour.

CHERRY JAM.—Weigh the fruit before it is stoned, and to each pound of fruit allow three quarters of a pound of sugar; stone the cherries and set them with the sugar and a few spoonfuls of water in the preserving-pan, to simmer gently beside the fire for half an hour. Then boil quickly, skimming all the time, for another half-hour. It is recommended to crack the cherry stones and put the kernels into the jam, but as this is both tedious and troublesome, a few drops of ratafia or almond essence will be found quite as good.

CHERRY MARMALADE.—Take out the stones and stalks from some fine cherries, and pulp them through a coarse sieve; to every three pounds of pulp add half a pint of currant-juice, and three-quarters of a pound of sugar to each pound of fruit; mix together, and boil until it will jelly. Put it into pots or glasses.

CHERRIES, To Preserve.—To a pound of cherries, allow three quarters of a pound of fine loaf sugar: carefully stone them, and as they are done throw part of the sugar over them; boil them fast with the remainder of the sugar, till the fruit is clear and the syrup thick. Take off the scum as it rises.

CHUTNEY, Bengal.—One pound of tamarind pulp, one pound of sultana raisins, the grated rind and half the juice of twelve lemons, one pound of tomato pulp, one pound of minced apples, a quarter of a pound of peeled garlic, six chopped onions, half a pound of red chillies, one pound of ginger in powder, one pound of moist sugar, and four quarts of strong vinegar. Mix the whole thoroughly together, and keep it for a month in a warm place to ferment; stir it occasionally, and then put it into small jars.

CITRON, Candied.—Cut the peels in half, then soak them in water for two hours; change the water, and soak for two hours more; repeat the operation until the water ceases to be bitter; drain them, and put them into saturated (hot) syrup, until they become soft and partly transparent, then take them out and dry them.

CITRON, To Preserve.—Pare and cut open

the citron, clean all out except the rind; boil it till soft. To a pound of citron, add a pound of sugar and a lemon to each pound: put the sugar and lemon together and boil it till it becomes a syrup, skimming it well; then put the syrup and citron together and boil it an hour.

COFFEE, Essence of.—Coffee, 1 part; water, 5 parts. Keep them at a heat of 209° Fahr., in a close vessel for ten minutes, then strain and evaporate at a low temperature in a vacuum, until reduced to one part.

CORN (Green), To Dry.—1. Clean the silk carefully from the corn. Put it in a steamer, over a kettle of hot water. Steam ten minutes. Then draw a knife through each row of kernels, and scrape out the pulp, leaving the hulls on the cob. Spread on plates and dry carefully without scorching.—2. Husk the corn and silk it. Then shave it off with a sharp knife. To six quarts of the shaved corn add a teacup of sugar and stir it all up together. Put it on a pie platter and plates and set in the oven. Let it scald ten minutes; then take it out and put it on a clean table cloth, and spread in the sun and let it dry. When dry, put in a jar or box to keep.

CORN (Green), Pickling.—When the corn is a little past the tenderest roasting ear state, pull it; take off one thickness of the husk, tie the rest of the husk down at the silk end in a close and tight manner; place them in a clean cask or barrel compactly together, and put on brine to cover the same of about two-thirds the strength of meat pickle. When ready to use in winter, soak in cold water over night, and if this does not appear sufficient, change the water and freshen still more.

CORN, To have Green the year round.—Gather it with the husks on, put in the bottom of a clean barrel some salt, proceed and fill the barrel as with pork, a layer of corn, then a layer of salt; when full, put on a large stone for pressure, add a little pickle of salt and water. Set the barrel in a cool place in the cellar, do not let it freeze, and it will keep perfect a year or more. When you wish to use it, take off the husks, soak it twenty hours in cold water, boil it and eat. Some days in February you can eat succotash and laugh at the storm. For this purpose, Stowell's Evergreen is best, but any good sweet corn will do. Used in this way, it can be enjoyed, as it is never hurtful.

CUCUMBERS (Green), To Pickle.—Make a brine by putting one pint of rock-salt into a pail of boiling water, and pour it over the cucumbers; cover tight to keep in the steam, and let them remain all night and part of a day; make a second brine as above, and let them remain in it the same length of time; then scald and skim the brine, as it will answer for the third brine, and let them remain in it as above; then rinse and wipe them dry, and add boiling hot vinegar; throw in a lump of alum as large as a nut to every pail of pickles, and you will have a fine, hard, and green pickle. Add spices, if you like, and keep the pickles under the vinegar. A brick on the top of the cover, which keeps the pickles under, has a tendency to collect the scum which may arise.

CUCUMBERS, To Green.—There is no way to impart a green color to cucumbers, that would not be injurious to health, except by the use of green leaves, like those from the grape vine. Possibly sap green, which is a preparation from

the juice of buck-thorn berries, would answer the purpose if it could be obtained here. Verdigris can be detected in nearly all the pickles of commerce; but its use is highly objectionable, as it is a poisonous acetate of copper. Pickles may be colored with it if the people place a higher regard on the color of the condiment they eat than on their health. Nearly all the shades of green are produced from some combination of arsenic, but this fact does not prevent the use of them for coloring confectionery.

CURRENT CATCHUP.—Nice fully ripe currants, 4 lbs.; sugar, 1½ lbs.; cinnamon, ground, 1 table-spoon; salt, with ground cloves and pepper, of each 1 tea-spoon; vinegar, 1 pt. Stew the currants and sugar until quite thick; then add the other ingredients, and bottle for use.

CURRENT (Red), Jelly.—With three parts of fine, ripe, red currants, mix one of white currants; put them into a clean preserving pan, and stir them gently over a clear fire until the juice flows from them freely; then turn them into a fine hair sieve, and let them drain well, but without pressure. Pass the juice through a folded muslin, or a jelly bag; weigh it, and then boil it fast for a quarter of an hour; add for each pound, eight ounces of sugar, coarsely powdered; stir this to it, off the fire, until it is dissolved; give the jelly eight minutes more of quick boiling, and pour it out. It will be firm, and of excellent color and flavor. Be sure to clear off the scum as it rises, both before and after the sugar is put in, or the preserve will not be clear. Juice of red currants, three pounds; juice of white currants, one pound: fifteen minutes. Sugar, two pounds: eight minutes. An excellent jelly may be made with equal parts of the juice of red and of white currants and of raspberries, with the same proportion of sugar and degree of boiling as mentioned in the foregoing receipt.

CURRENTS, To dry with Sugar.—Take fully ripe currants, stemmed, 5 lbs.; sugar, 1 lb.; put into a brass kettle, stirring at first, then as the currants boil up to the top, skim them off; boil down the juicy syrup until quite thick and pour it over the currants, mixing well; then place on suitable dishes, and dry them by placing in a low box over which you can place musketo-bar, to keep away flies. When properly dried, put in jars and tie paper over them. Put cold water upon them and stew as other fruit for eating or pie-making, adding more sugar if desired.

CURRENT SYRUP.—Take one pint of the expressed juice of currants and two pounds of the best refined sugar; dissolve the sugar in the juice by the aid of heat, not exceeding 212°, and set aside for twenty-four hours. Then remove the scum, and strain through very fine muslin, if any sediment be present. To preserve for use, add one gill of alcohol at 60 per cent.

CURRENT (Black) Jelly.—To each pound of picked fruit, allow one gill of water; set them on the fire in the preserving pan to scald, but do not let them boil; bruise them well with a silver fork, or wooden beater,—take them off and squeeze them through a hair sieve; and to every pint of juice allow a pound of loaf or raw sugar; boil it ten minutes.

CURRENTS, To Preserve.—Gather the currants upon a dry day; to every pound allow half a pint of red currant juice and a pound and a half

of finely pounded loaf sugar. With scissors clip off the heads and stalks; put the juice, currants, and sugar in a preserving pan; shake it frequently till it boils; carefully remove the fruit from the sides of the pan, and take off the scum as it rises; let it boil for ten or fifteen minutes. This preserve is excellent, eaten with cream.

EGGS, To Preserve.—1. For each patent pill full of water put in one pint of fresh slaked lime, and 1 pint of common salt, mix well, fill your barrel about half full of this fluid, then with a dish, let your fresh eggs down into this, and they will settle down right side up with care every time, and we can assure any one who will try it, that they will keep any reasonable length of time without any further care than to keep them covered with the fluid. Eggs may be laid down in this way any time after June.—2. Eggs may be preserved by: keeping them buried in salt, or dipping them during two or three minutes in boiling water. The white of the egg then forms a kind of membrane, which envelops the interior, and defends it from the air.—3. The week before going to sea, on a four months' voyage, I gathered in sixty dozen eggs for cabin sea-stores, taking especial pains to prove every egg of the lot a good one; besides, I got them from my farmer friends, and know they were all fresh. Then I fixed them for keeping, by taking five or six dozen at a time in a basket, and dipping them about five seconds in the cook's "copper" of boiling water. After scalding, I passed the eggs through a bath, made by dissolving about five pounds of the cheapest brown sugar in a gallon of water, and laid them out on the galley floor to dry. There I had my sixty dozen eggs sugar-coated. I packed them in charcoal dust instead of salt; I tried salt ten years, and I don't believe it preserves eggs a mite. The steward had strict orders to report every bad egg he should find. During the voyage he brought three, not absolutely spoiled, but a little old like. All the others, or what was left of them, were as fresh when we came in as they were when I packed them away.—4. A Parisian paper recommends the following method for the preservation of eggs: Dissolve four ounces of beeswax in eight ounces of warm olive oil, in this put the tip of the finger and anoint the egg all round. The oil will immediately be absorbed, and the shell and pores filled up by the wax. If kept in a cool place the eggs, after two years, will be as good as if fresh laid.—5. Take of quick lime one pound; salt, one pound; saltpetre, three ounces; water, one gallon. It is necessary that the solution be boiled ten or fifteen minutes, and when cold put in the eggs, small end downward, using a vessel lined with lead, and placing in a cold but dry cellar.—6. Dip them into a solution of gun-cotton, (collodion), so as to exclude the air from the pores of the shell; or the collodion may be applied with a brush.—7. A writer recommends the dissolving of gum shellac in alcohol, when the mixture may be applied with a common paint-brush. When dry, pack in bran, points downward. Eggs so preserved will keep a very long time. When about to be used, the varnish may be washed off.—8. Get a good sweet wooden box, put about an inch of salt on the bottom; take sweet grease of any kind, lard or drippings, rub the eggs all over with it and put them, the little end down, in the salt; then spread a layer of salt and then add more eggs.—9. Pack the eggs in a cask with the smaller end downward; and fill up

the cask with melted tallow. This method is practiced very extensively in Russia and in other parts of Europe, and is generally successful.—10. Keep them at the temperature of 40° or less in a refrigerator. Specimens had been exhibited, which were fourteen months old, and still perfectly fresh and sweet.—11. Apply with a brush a solution of gum arabic to the shells, or immerse the eggs therein; let them dry, and afterwards pack them in dry charcoal dust. This prevents their being affected by any alterations of temperature.—12. Of all the materials that have been recommended for this purpose, water glass, or silicate of soda, is the most effectual and least objectionable.

EGGS, To Dry.—The eggs are beaten to uniform consistency, and spread out in thin cakes on batter plates. This dries them into a paste, which is to be packed in close cans and sealed. When required for use, the paste can be dissolved in water, and beaten to a foam like fresh eggs. It is said that eggs can be preserved for years in this way, and retain their flavor.

EGGS, PICKLING.—At the season of the year when the stock of eggs is plentiful, cause some four or six dozen to be boiled in a capacious saucepan until they become quite hard. Then, after removing the shells, lay them carefully in large mouthed jars, and pour over them scalding vinegar, well seasoned with whole pepper, allspice, a few races of ginger, and a few cloves of garlic. When cold they are bunged down close, and in a month are fit for use. Where eggs are plentiful, the above pickle is by no means expensive, and as an acetic accompaniment to cold meat, it can not be outvalued.

EGGS, PORTABLE.—Take fresh laid eggs, any quantity, break them into an evaporating basin, and expose them to a heat of 125° Fahr. in a water-bath, until hard, then pack them in airtight vessels. For use, take cold water, 3 parts; dried egg, 1 part. Beat them well together.

FLOWERS, To Preserve and Restore.—Flowers may be preserved in a fresh state for a considerable time, by keeping them in a moist atmosphere. A flat dish of porcelain had water poured into it. In the water a vase of flowers was set; over the whole a bell-glass was placed, with its rim in the water. The air that surrounded the flowers being confined beneath the bell-glass, was kept constantly moist with the water that rose into it in the form of vapor. As fast as the water was condensed it ran down the sides of the bell-glass back into the dish; and if means had been taken to inclose the water on the outside of the bell-glass, so as to prevent its evaporating into the air of the sitting room, the atmosphere around the flowers would have remained continually damp. We recommend those who love to see plenty of fresh flowers in their sitting-rooms in dry weather to adopt this method. The experiment can be tried by inverting a tumbler over a rose-bud in a saucer of water.

Another method by which some flowers may be preserved for many months, is to carefully dip them, as soon as gathered, in perfectly limpid gum water, and after allowing them to drain 2 or 3 minutes, to set them upright, or arrange them in the usual manner in an empty vase. The gum gradually forms a transparent coating on the surface of the petals and stems, and preserves their figure and color long after they have become dry and crisp.

Faded flowers may be generally more or less restored by immersing them half-way up their stems in very hot water, and allowing them to remain in it until it cools, or they have recovered. The coddled portion of the stems must then be cut off, and the flowers placed in clean cold water. In this way a great number of faded flowers may be restored, but there are some of the more fugacious kinds, on which it proves useless.

FLOWERS, To Preserve in Sand.—Get the finest and whitest of river or lake sand, wash it so clean that the water in flowing from it will be pure as if from the well. Heat it very hot and while hot mix it thoroughly with stearic acid in the proportion of one pound of the latter to one hundred pounds of sand. Let it cool. Take a small common sieve and nail boards under the bottom to prevent the sand from running through; place enough sand in the sieve to hold the flowers in position—not covering them; then with a sheet of paper twisted in the form of a cone or funnel, carefully let the sand pass through it, between, around and over the flowers—cover about half an inch. Set by the stove or in some warm place where the sand will be kept at a temperature of seventy degrees Fahrenheit. When they have remained sufficiently long, remove the boards carefully from the bottom and let the sand run out, leaving your flowers preserved in perfection. The only difficulty is to know when the process is complete, different plants differing in the time required, those with thick leaves and petals needing more than light ones. No exact rule can be given on this point. Seven hours are sufficient for some, while others require twelve and even more. Experience alone can determine this. It is best always for a beginner to experiment with a single plant at a time at first. When he has succeeded with a certain variety and noted the time required, he can proceed to others, and in a short time become versed in this art. It should be mentioned that the flowers for this purpose should be picked dry—say midday, after the dew is evaporated.

FLOWERS (Cut), To Preserve.—Add to the water a little of a solution of carbonate of ammonia and a few drops of phosphate of soda. The effect of this in giving the flower a deeper color and a stronger appearance is quite wonderful, and by cutting off every other day about one half inch of the stems of the flowers with a sharp knife, they may be kept as long as their natural life would last.

FRUIT, KEEPING.—Have your cellar or fruit-room neither too dry nor too moist. This is indispensable. If moist, your fruit will rot; if dry, it will shrink. If you are incredulous about this, set your fruit in your dwelling-room, or where there is a high, dry temperature. This will satisfy you as to the shrinking. Dampen a bin or barrel, and keep so for awhile, (with the fruit in it), and you will need no more urging. The "course between," as the old adage has it, is the right way. I know we are apt to have our hobbies and go to extremes. The course between is not always relished. But facts are facts, and they are not only stubborn, but they will always remain so.

Fruit must be put where there is not sufficient moisture to rot it, as an excess will surely do. On the other hand, the dry must be avoided, or there will be shrinking and a dry fruit. This is

as common an experience as life itself. Open bins, unless the cellar or fruit-room be very damp, will dry the fruit. This is generally so. Open barrels are less affected in this way, but still affected. The best way is to close your barrel after the fruit has passed through its sweating, which it will do in a few days, and leave a small open space, say a couple of apertures across the head of the barrel, of half an inch or less in diameter. Or, you are pretty safe (in the case of apples, which are more particularly referred to) to head up tight, after the sweating operation has gone through with, and the fruit is again dry. This we have found eminently successful. We have found some mold where the barrel was closed as soon as filled, the fruit getting moist, (sweating) and the moisture instead of passing off by the vent, had to be absorbed by the wood of the barrel. But before this is done mischief will be wrought. Still we have known cases of clear exceptions. But this will not do; we want cases without exceptions, without doubt; we want to save our fruit beyond peradventure. And we can in the way we have described.

As to temperature, this cannot be too low, providing it does not freeze the fruit. And uniformity is almost as important as depression of heat. These two are the vital and important points. Kept at the freezing point, or just out of its range, there will be little change in the fruit, either to rot or to mature. An apple can thus be kept "green" the winter through—for aught we know any apple, but certainly the winter fruit. We have it, therefore, in our power, to ripen or not as we like, and this is quite an advantage; to avail ourselves of it any winter with the greatest of interest, and a most decided advantage. We could not well do without it. We keep cold the one part of our cellar, that containing the spring fruit. Frost sometimes steals upon us, but we permit it to steal gradually out again; for the world we would not hurry it, for that would spoil our fruit. When once frosted we permit it to remain so as long as we can, for that is a safe keeping so long as it lasts.

A little fresh air seems to be a benefit. It is hardly our experience, however, as confined fruit, where the air is not damp or mold infected; where it is pure, some from the slight evaporation of the fruit, particularly apples, have always kept well with us so far as we have experimented. Still we see no harm from a change of atmosphere of our room. We therefore, when the air is not damp, occasionally raise our windows a little, or when the temperature is the same as that of the cellar, or a little lower. Rashness here is fatal. If the air without should be warm and a south wind blow, with the windows raised there will be such a change as will seriously affect the fruit. The cold air will be driven out of the cellar or fruit room. Rather let the cold air in severely.

But uniformity, with a little fresh air occasionally, is what is wanted.

The following method of preserving apples is from an English agricultural periodical published more than thirty years ago. As the method proposed is easily available at a farm house and is simple, we think it worthy of trial: It seems not to be generally known that apples may be kept the whole year round, by being immersed in corn, which receives no injury from their contact. If the American apples were packed

among grain, they would arrive here in much better condition than they do at present. The word corn, as above used, means any cereal grain, such as oats or barley, and not simply maize.

FRUITS, Preserving by Sulphite of Lime.

—The great agents in causing the decay of fruit, vegetables, wine, etc., are heat and air. If, however, the latter be excluded, some fruits and vegetables, and most wines, will bear a pretty high temperature. Further, it is only one element of the air—the oxygen—that proves so destructive, and if this be removed, putrefaction and fermentation are either stopped or greatly retarded. Some substances have a powerful affinity for oxygen, and remove it entirely from the atmosphere, under some circumstances. Thus, if sulphur be burnt in the air, it combines with the oxygen, forms sulphurous acid, which dissolves in water or wine, and leaves the remaining air free from oxygen. Hence the use of burning sulphur in wine casks before filling with wine. The oxygen is all removed, and the agent which turns alcohol to vinegar not being present, there is no danger of the wine turning sour. As a convenient substitute for burning sulphur, (sulphurous acid), sulphite of lime (a combination of sulphurous acid and lime) has been used. It has a strong tendency to absorb oxygen and become converted into sulphate of lime (gypsum). It therefore removes the free oxygen from the wine and from the cask, and entirely suspends the process of acetification, as it is called—that is the conversion of the alcohol of the wine into vinegar. For this purpose sulphite of lime has been extensively used, especially for the preservation of cider.

It has also been used for the preservation of fruit. If dissolved in the syrup or water in which the fruit is placed, it will soon absorb all the oxygen present, and the fruit will not decompose. In the case of wine or cider, however, the resulting gypsum, which is insoluble, will fall freely to the bottom of the vessel, and produce no effect on the wine unless too much is used. But in the case of fruit, the sediment is apt to settle on the fruit, though not to such an extent as to do much harm. The proper quantity to be used is noted on the bottles in which the sulphite is sold; and in the case of fruit, an exposure to the air for a few hours before use will in general remove all unpleasant taste or smell. We must add, however, that although the process is simple and cheaper than the ordinary method of canning fruits, we prefer the latter.

FRUITS, Candying.—Various fruits may be candied or crystallized by putting them for a few hours in scalding hot syrup, made with three pounds and a half of white sugar, boiled for a few minutes in one pint of orange flower or rose water. The fruit should be steeped in the hot syrup for two or three hours, then strained, and put into an oven with the door open. This will dry the remaining moisture, and the sugar will crystallize round the fruit.

FRUIT, Drying.—When much fruit is dried, it is necessary to have a house for the purpose. Small quantities should be so arranged as to be placed near the kitchen fire when taken in at night or during stormy days. Those who have hot-bed sash, can easily arrange a drying apparatus which will dry rapidly and at the same time

keep off insects. A hot-bed frame with a bottom to it, and raised above the ground, makes a capital drying box. The sash should be elevated at one end to allow the moisture to pass off, covering the opening with netting.

FRUIT (Dried), To Protect from Worms.

It is said that dried fruit put away with a little bark sassafras (say a large handful to the bushel) will save for years, unmolested by those troublesome little insects, which so often destroy hundreds of bushels in a single season. The remedy is cheap and simple, but we venture to say a good one.

GRAPES, To Keep.—1. They must not be too ripe. Take off any imperfect grapes from the bunches. On the bottom of a keg put a layer of bran that has been well dried in an oven, or in the sun. On the bran put a layer of grapes, with bran between the bunches so that they may not be in contact. Proceed in the same way with alternate layers of grapes and bran, till the keg is full; then close the keg so that no air can enter.

—2. In a box first lay a paper, then a layer of grapes selecting the best bunches and removing all imperfect grapes, then another paper, then more grapes, and so until the box is full; then cover all with several folds of paper or cloth. Nail on the lid, and set in a cool room where it will not freeze. I use small boxes, so as not to disturb more than I want to use in a week or so. Give each bunch plenty of room so they will not crowd, and don't use newspapers. Some seal the stems with sealing wax and wrap each bunch by itself, but I get along without that trouble. The grapes should be looked to several times during the winter. Should any mould or decay, they should be removed and the good ones again repacked. By this means I have had, with my pitcher of cider and basket of apples, my plate of grapes daily, besides distributing some among my friends and the sick of the neighborhood.

—3. (*Chinese Method.*) It consists in cutting a circular piece out of a ripe pumpkin or gourd, making an aperture large enough to admit the hand. The interior is then completely cleaned out, the ripe grapes are placed inside, and the cover replaced and pressed in firmly. The pumpkins are then kept in a cool place—and the grapes will be found to retain their freshness for a very long time. We are told that a very careful selection must be made of the pumpkin, the common field pumpkin, however, being well adapted for the purpose in question.

GRAPES (Green), To Preserve.—The grapes must not be too old; the best time is just before the seed begins to harden. They are, after being picked and freed from stems, put into bottles (strong wine or champagne bottles are best) so as nearly to fill the latter. These are then filled with fresh and clean water. After this they are all placed in a large kettle, partially filled with cold water, and the temperature raised nearly to the boiling point. The water in the bottles expands by the heat, and part is driven out. As soon as sufficiently heated, they are taken off, enough water poured out of each bottle to merely allow a well-fitting cork to be pressed in tightly. After being corked they are sealed up with sealing wax or common beeswax. As the bottles cool down a partial vacuum is left in the neck of each. Grapes thus preserved have kept for years in this climate, where canned fruit almost invariably spoils during the hot summers. They

can at any time be opened and prepared like fresh grapes, no difference will be found in the taste. It is better to use the water, also, in which they were kept, as it contains a large percentage of tartaric acid, which gives them the pleasant sour taste.

GRAPES, Canned.—Squeeze the pulp from the skin, as the seeds are objectionable; boil the pulp until the seeds begin to loosen, having the skins boiling in a little water, hard, as they are tough. When the pulp seems tender, put it through the sieve; then add the skins, if tender, with the water they boil in, if not too much. Use a large coffee cup of sugar for a quart can; boil until thick, and can in the usual way.

GRAPE CATSUP.—Take five pounds of grapes, boiled and cullendered, two and a half pounds of sugar, one pint of vinegar, one tablespoonful each of cinnamon, cloves, allspice and pepper, and half a tablespoonful of salt. Boil until the catsup is a little thick.

GRAPE JELLY.—Take some of the best black grapes, strip them from the stalks, stir them with a wooden spoon over a gentle fire till they burst; strain off the juice (without pressing) through a jelly-bag or thick muslin; weigh the juice and boil it rapidly for twenty minutes; then take it from the fire, and to each pound of juice add fourteen ounces of good sugar roughly powdered, and boil quickly for a quarter of an hour, stirring it constantly, and skimming it carefully. It will be quite clear, and of a pale rose color.

GHERKINS, Pickled.—Steep them in strong brine for a week, then pour it off, heat it to the boiling point, and again pour it on the gherkins; in 24 hours drain the fruit on a sieve, put it into wide-mouthed bottles or jars, fill them up with strong pickling vinegar, boiling hot, bung down immediately, and tie over with bladder. When cold, dip the corks into melted bottle wax. Spice is usually added to the bottles, or else steeped in the vinegar.

In a similar way are pickled, onions, mushrooms, cucumbers, walnuts, samphires, green gooseberries, cauliflowers, melons, barberries, peaches, lemons, tomatoes, beans, radish pods, codlins, red cabbage, (without salt, and with cold vinegar,) beet-root, (without salting,) garlic, peas, etc., etc., observing that the softer and more delicate articles do not require so long soaking in brine as the harder and coarser kinds, and may be often advantageously pickled by simply pouring very strong pickling vinegar over them, without applying heat.

HAMS, To cure.—For each ham of twelve pounds weight: Two pounds of common salt; 2 ounces of saltpetre; $\frac{1}{4}$ pound of bay salt; $\frac{1}{4}$ pound of coarse sugar.

This should be reduced to the finest powder. Rub the hams well with it; female hams are not often heavy enough to do this thoroughly. Then place them in a deep pan, and add a wineglassful of good vinegar. Turn the hams every day; for the first three or four days rub them well with the brine; after that time it will suffice to ladle it over the meat with a wooden or iron spoon. They should remain three weeks in the pickle. When taken from it wipe them well, put them in bags of brown paper and then smoke them with wood smoke for three weeks. Most grocers, dealers in hams, and others, who are particular in their meat, usually take the precaution to case

each one, after it is smoked, in canvas, for the purpose of defending it from the attacks of the little insect, the dermestes lardarins, which, by laying its eggs in it, soon fills it with its larvæ, or maggots. This troublesome and expensive process may be altogether superseded by the use of pyroligneous acid. With a painter's brush, dipped in the liquid, one man, in the course of a day, may effectually secure two hundred hams from all danger. Care should be taken to insinuate the liquid into all the cracks, etc., of the under surface. This method is especially adapted to the preservation of hams in hot climates.

HAMS, To cure.—1. Take $2\frac{1}{2}$ pounds sugar, 7 lbs. coarse salt, 2 oz. saltpetre and 4 gallons water, boil together and put on cool to 100 pounds of meat. Let the meat lie in the pickle eight weeks.—2. To a cask of hams, say from 25 to 30, after having packed them closely and sprinkled them slightly with salt, I let them lie thus for 3 days; then make a brine sufficient to cover them, by putting salt into clear water, making it strong enough to bear up a sound egg or potato. Then add $\frac{1}{2}$ lb. of saltpetre, and a gallon of molasses; let them lie in the brine for 6 weeks—they are then exactly right. Then take them up and let them drain; then while damp, rub the flesh side and the end of the leg with finely pulverized black, red, or cayenne pepper; let it be as fine as dust, and dust every part of the flesh side, then hang them up and smoke. You may leave them hanging in the smokehouse or other cool place where the rats cannot reach them, as they are perfectly safe from all insects.

HAMS (Smoked), To keep.—Make sacks of coarse cotton cloth, large enough to hold one ham, and fill in with chopped hay all around about two inches thick. The hay prevents the grease from coming in contact with the cloth and keeps all insects from the meat. Hang in the smokehouse, or other dry, cool place, and they will keep a long time.

HAMS (Mutton), To Pickle for Drying.—First take weak brine and put the hams into it for 2 days, then pour off and apply the following, and let it remain on from 2 to 3 weeks according to size: For each 100 lbs., take salt 6 lbs.; saltpetre 1 oz.; saleratus 2 ozs.; molasses 1 pt.; water 6 gals., will cover these if closely packed.

HERBS, To Dry.—They should be gathered in a dry season, cleansed from discolored and rotten leaves, screened from earth or dust, placed on handles covered with blotting paper and exposed to the sun or the heat of a stove, in a dry, airy place. The quicker they are dried the better, as they have less time to ferment or grow mouldy; hence they should be spread thin and frequently turned; when dried they should be shaken in a large meshed sieve to get rid of the eggs of any insects. Aromatic herbs ought to be dried quickly with a moderate heat, that their odor may not be lost. Cruciferous plants should not be dried, as in that case they lose much of their antiscorbutic qualities. Some persons have proposed to dry herbs in a water bath, but this occasions them, as it were, to be half boiled in their own water.

HONEY, Preservation of.—After the honey is passed from the comb, strain it through a sieve, so as to get out all the wax; gently boil it, and skim off the whitish foam which rises to the surface, and then the honey will become perfectly clear. The vessel for boiling should be earthen,

brass, or tin. The honey should be put in jars when cool, and tightly covered.

To keep honey in the comb, select combs free from pollen, pack them edgewise in jars or cans, and pour in a sufficient quantity of the boiled and strained honey (as above) to cover the combs. The jars or cans should be tightly tied over with thick cloth or leather. These processes have been in use for twenty years with unvarying success.

HORSE-RADISH, To have in Keeping.—Grate a sufficient quantity during the season, while it is green, put it in bottles, fill up with strong vinegar, cork them tight, and set them in a cool place.

ICE, To preserve.—1. Put the ice into a deep dish, cover it with a plate, and place the dish on a pillow stuffed with feathers, and cover the top with another pillow carefully, by this means excluding the external air.—2. Make two bags of stout woolen fabric; the outer bag should be made at least two inches wider each way than the inner one. After placing one bag inside the other, stuff feathers between the two, and sew the two bags together at the top. Put a block of ice into a bag of this description, and it will be preserved from melting for nearly a week; when under exposure it will melt in less than an hour.

JAM, Apricot or Plum.—After taking away the stones from the apricots, and cutting out any blemishes they may have, put them over a slow fire, in a clean stew-pan, with half a pint of water; when scalded, rub them through a hair sieve; to every pound of pulp put one pound of sifted loaf sugar, put it into a preserving-pan over a brisk fire, and when it boils skim it well, and throw in the kernels of the apricots and half an ounce of bitter almonds, blanched; boil it a quarter of an hour fast, and stirring it all the time; remove it from the fire, fill it into pots, and cover them. Green gages may be done in the same way.

JAM, Currant (Red, White or Black).—Strip the currants from the stalks, and put them into the preserving-pan, with three quarters of a pound of sugar to each pound of fruit; add the sugar after the fruit has boiled a few minutes; boil together, mashing the fruit with a wooden spoon, and taking off all the scum; boil all gently for half an hour, then fill the jars.

JAM, Gooseberry.—Choose the red hairy gooseberry when quite ripe; cut off the tops and tails, weigh them and put them into a preserving-pan with a quarter of a pint of red currant juice to every three pounds of gooseberries; let them boil quickly together for nearly an hour, stirring carefully all the time. Then add the sugar in the proportion of three quarters of a pound to each pound of fruit, and boil for forty minutes. Gooseberry jam takes a long time to boil; if not well done it will neither look nor keep well.

JAM, Peach.—This confection should be made of the clingstone peach in preference, it being more juicy and of a higher flavor than the other kind of peach, the stone of which separates from the pulp. Treat the peaches exactly in the manner directed for apricots, using the same quantity of sugar.

JAM, Raspberry.—Take 1 pound loaf-sugar to every pound of fruit; bruise them together in your preserving-pan with a silver spoon, and let them simmer gently for an hour. When cold,

put them into glass jars, and lay over them a bit of paper saturated with brandy—then tie them up so as carefully to exclude the air.

JAM, Strawberry.—Put an equal weight of good ripe scarlet strawberries and broken loaf sugar into a preserving-pan; let them boil very slowly till the sugar is all dissolved. The fruit should be kept as much unbroken as possible, therefore stir very carefully; remove the scum as it rises; the addition of half a pint of white currant juice to every four pounds of fruit is a great improvement, strawberry jam being rather a luscious preserve. Boil from forty minutes to an hour, until the fruit looks clear.

JELLY, Apple.—Pare, core, and cut thirteen good apples into small bits: as they are cut throw them into two quarts of cold water: boil them in this, with the peel of a lemon, till the substance is extracted, and nearly half the liquor wasted: drain them through a hair sieve. And to a pint of the liquid, add one pound of loaf sugar, pounded, the juice of one lemon, and the beaten whites of one or two eggs: put it into a saucepan, stir it till it boils, skim till clear, and then mould it.

JELLY, Calves' Feet.—Take eight calves' feet and boil them until the water becomes a good jelly, then add sugar, 1 pound; Port wine, 2 pints; white of two eggs and shells. Boil for five minutes, and clarify.

JELLY, Hartshorn.—Hartshorn, 1 pound; water, 1 gallon; peel of two lemons. Boil over a gentle fire until sufficiently thick, strain, and add loaf-sugar, $\frac{1}{2}$ pound; whites of ten eggs (beaten to a froth); juice of six lemons. Whisk together well.

JELLY, Sago.—Sago, 1 pound; water, 5 pints. Wash the sago, then boil it with the water until reduced to a transparent jelly; lastly, flavor it to taste.

KETCHUP, Camp.—1. Anchovies, 4 ozs.; mix with beer, 2 quarts; white wine, 1 quart; boil a short time, add peeled shallots, 3 ozs.; black pepper, mace, nutmegs, and ginger, of each, $\frac{1}{2}$ oz.; macerate for 14 days, and bottle.—2. Vinegar, 2 pints; walnut ketchup, 1 pint; mushroom ketchup, 3 ozs.; garlic, 4 cloves; Cayenne pods, $\frac{1}{2}$ oz.; soy, 2 ozs.; wine, 4 ozs.; 3 anchovies; 1 oz. salt. Macerate together 3 weeks, and bottle.—3. Vinegar, 1 pint; walnut ketchup, 4 ozs.; soy, 2 ozs.; 12 chopped anchovies; 2 cloves of garlic, and Cayenne pods, 1 drachm; macerate three weeks, and bottle.

KETCHUP, Mushroom.—1. Picked mushrooms, 4 lbs.; salt, 2 lbs.; sprinkle it on the mushrooms, and when they liquefy, remove the juice, add pimento, 6 ozs.; cloves, 1 oz.; boil gently, and strain. The remaining liquor, if any, may be treated with pepper, mace, and ginger, for a second quality.—2. Express the mushrooms in the tincture press, and to each gallon add salt, 8 ozs.; shallots, $1\frac{1}{2}$ oz.; pimento, 1 oz.; black pepper and ginger, of each $\frac{1}{2}$ oz., and cloves, 1 drachm.

Mushroom ketchup is apt to lose strength, and turn bad, in a few weeks after it is first made; but again boiling with a little fresh spice at the end of two months, will make it keep good a year round.

KETCHUP, Walnut.—1. The juice of green tender walnuts expressed, 1 gallon; boil and skim till clear, add 2 lbs. of anchovies; shallots, 2 lbs.; pepper, mace, and cloves, of each 1 oz.;

and a sliced clove of garlic. Simmer 15 minutes, add salt to taste, strain, and when cool, bottle. Let it stand 12 months before using.—
 2. Tender walnuts bruised, $\frac{1}{2}$ bushel; add, to each gallon of juice, red wine, 1 quart; anchovies and bay salt, of each 4 ozs.; allspice, 1 oz.; black pepper, 2 ozs.; cloves and mace, of each, 2 drachms; a little ginger, and sliced horseradish. Simmer slowly until enough, and when cold, bottle.—
 3. Green walnut shells bruised, 4 parts; salt, 1 part; mix, and in 7 days express the liquor. To each gallon, add allspice, 4 ozs.; ginger, 3 ozs.; long pepper, 2 ozs.; cloves and mace, of each 1 oz. Simmer for 30 minutes, cool, and bottle.

LAMB, To Keep Fresh in the Summer.—In a few hours after the lamb is slaughtered, take all four quarters and cook them done. Each subsequent day afterwards, as you prepare your dinner, place the remaining quarters back in the stove and thoroughly heat them; this seems to prevent taint from appearing. In this way any kind of fresh meat can be kept sweet for a week, in the hottest weather.

LARD, To Keep from Molding.—It is not likely to mold if properly tried and kept in a cool, dry place; earthen crocks or pans well tinned are good to put lard in for keeping. Lard made from intestinal fat, will not keep so long as leaf fat. It should be soaked two or three days in salted water, changed each day.

LEMON ACID, Pure Crystallized.—Take lemon juice, any quantity. Put it into a vessel of china, glass, or wood, and add finely powdered chalk until the whole of the acid is saturated, noting the exact weight of the dry chalk employed; then collect the precipitate and well wash it with water, and for every ten parts of chalk consumed, add sulphuric acid, $9\frac{1}{2}$ parts; diluted with water, 60 parts. Mix while still warm with the precipitate, and stir well together; let them remain for twelve hours; then decant the clear, wash the white powder with clear water, and mix the two liquors; lastly, strain, evaporate, and crystallize. To purify it, repeat the operation of washing the crystals, dissolving and crystallizing two or three times. Great care must be used in evaporating the solution, for if too much heat should be employed, or the process carried too far, the acid product will be injured.

MARMALADE, Apricot.—Take off the peel of some large ripe apricots, cut them in two, and remove the stones; weigh the fruit and lay it on dishes; to every pound of apricots put one pound of finely powdered loaf sugar, strew it over the fruit, and let it lie for one night; next day put the fruit and sugar into a preserving pan with a teaspoonful of ratafia to every pound of sugar; let the whole boil very gently, and as each piece of apricot appears clear take it out and lay it in a jar; skim off any scum that may arise on the syrup, and when all the fruit is done pour the syrup over it in the jars.

MARMALADE, Red Currant.—Squeeze some ripe red currants through a coarse muslin; to every pint of juice put a pound of loaf sugar; boil it very well; when nearly boiled to a jelly, have some bunches of large white currants nicely picked, throw them in, and boil five minutes; it should turn out stiff and transparent.

MARMALADE, Gooseberry.—Take the gooseberries when fully grown, but not ripe, boil them in water five minutes, then drain them

through a colander, bruise the fruit, add an equal quantity of loaf sugar, and to every three pounds of sugar put the rind of a lemon grated and half the juice; it should be boiled until stiff.

MARMALADE, Mixed.—Pare, core, and quarter one peck of pears, the same quantity of orange quinces, simmer in sufficient water to keep them from burning until tender, flavoring them with one quarter of a pound of sliced green ginger, the rind of one orange and one lemon, one ounce of blanched and shredded sweet almonds, a dozen bitter almonds or peach pits. Pare, core and quarter two pecks of all pippins, and add them when the quinces are tender. When the apples are tender add for each pound of the pulp one half pound of good brown sugar, simmer a few minutes altogether and seal hot.

MARMALADE, Orange.—Choose the largest Seville oranges, as they usually contain the greatest quantity of juice, and choose them with clear skins, as the skins form the largest part of the marmalade. Weigh the oranges, and weigh also an equal quantity of loaf sugar. Skin the oranges, dividing the skins into quarters, and put them into a preserving pan; cover them well with water, and set them on the fire to boil; in the meantime prepare your oranges; divide them into gores, then scrape with a teaspoon all the pulp from the white skin; or, instead of skinning the oranges, cut a hole in the orange and scoop out the pulp; remove carefully all the pips, of which there are innumerable small ones in the Seville orange, which will escape observation unless they are very minutely examined. Have a large basin near you with some cold water in it to throw the pips and skins into—a pint is sufficient for a dozen oranges. A great deal of glutinous matter adheres to them, which, when strained through a sieve, should be boiled with the other parts. When the skins have boiled till they are sufficiently tender to admit of a fork being stuck into them, strain them; some of which may be boiled with the other parts; scrape clean all the pith, or inside, from them; lay them in folds, and cut them into thin slices of about an inch long. Clarify your sugar; then throw your skins and pulp into it, stir it well, and let it boil about half an hour. If the sugar is broken into small pieces, and boiled with the fruit, it will answer the purpose of clarifying, but it must be well skimmed when it boils.

MARMALADE, Quince.—Half fill a preserving pan with water, slice your quinces into it, and stew, stirring occasionally till they are a pulp; strain it through a hair sieve, and to every pint of pulp add three quarters of a pound of loaf sugar pounded; boil together till it jellies; put it into jars while hot. If well made it will keep many years in a dry place.

MARMALADE, Quince.—Take quinces that are quite ripe, pare and cut them in quarters, take out the cores, put them into a stew-pan with nearly enough spring water to cover them, keep them closely covered, and let them stew gently till they are quite soft and red, then mash and rub them through a hair sieve. Put them in a pan over a gentle fire, with as much thick clarified sugar as the weight of the quinces; boil them an hour and stir the whole time with a wooden spoon to prevent its sticking; put it into pots, and when cold tie them down.

MARMALADE, Transparent.—Cut very pale Seville oranges into quarters; take out the pulp,

put it into a basin, and pick out the skins and seeds. Put the peels into a little salt and water, and let them stand all night, then boil them in a good quantity of spring water until they are tender; cut them in very thin slices, and put them into the pulp. To every pound of marmalade put one pound and a half of double refined beaten sugar; boil them together gently for twenty minutes; if they are not transparent, boil them a few minutes longer. Stir it gently all the time, and take care not to break the slices. When it is cold, put it into jelly and sweetmeat glasses; tie down tight.

MEAT, To Cure.—To one gallon of water add one and a half pounds of salt, half a pound of sugar, half an ounce of saltpetre, half an ounce of potash. In this ratio the pickle to be increased to any quantity desired. Let these be boiled together until all the dirt from the sugar rises to the top and is skimmed off. Then throw it into a tub to cool, and when cold pour it over your beef or pork, to remain the usual time, say four or five weeks. The meat must be well covered with pickle, and should not be put down for at least two days after killing, during which time it should be slightly sprinkled with powdered saltpetre, which removes all the surface blood, etc., leaving the meat fresh and clean. Some omit boiling the pickle, and find it to answer well; though the operation of boiling purifies the pickle by throwing off the dirt always to be found in salt and sugar. If this recipe is properly tried it will never be abandoned. There is none that surpasses it, if so good.

MEAT (Frozen), To keep.—After the meat is frozen, tie in papers and pack in a flour barrel with clean straw, pushing the straw down tightly with a thin lath. Then put the barrel in a box, five or six inches larger than the barrel every way, and fill the space with dry sawdust.

MEAT (Fresh), Preserving.—1. Place in large earthenware pans, putting clean heavy stones on it, and covering it with skim milk; the milk will become sour, of course, but may afterward serve as food for pigs, and the meat will be found to have kept its natural primitive freshness, even after eight or ten days. This is a German method, and may answer where the ice house or spring house is wanting, and where the skim milk is plenty.—2. At Monte Video, meat is now preserved in large quantities for export, by a process which is thus described:—A pickle is made containing eighty-five per cent. of water, with hydrochloric acid, glycerine, and bisulphite of soda, and in this the meat, cut into lumps of from five to fifty pounds weight, is soaked for some days. When taken out, it is dusted over with dry bisulphite of soda, and is closely packed in airtight boxes, in which it will keep sweet for years, and can be rendered fit for use at any time by soaking in a bath of cold water in which a small quantity of vinegar is mixed.—3. According to a recipe recently patented in England, meat of any kind may be preserved in any temperature after it has been soaked for ten minutes in a solution made of the following ingredients, well mixed: One pint of common salt dissolved in four gallons of clear cold water and half a gallon of the bisulphite of calcium solution. It is said that experiments show that meats so prepared will keep for twelve days in a temperature of from 80 to 110 degrees, and preserve their odor and flavor unimpaired. By repeating

the process meats may be indefinitely preserved, and if it is desired to keep them an unusually long time, a little solution of gelatine or white of an egg may be added to the wash.

MEAT, Phenyl Paper to Preserve.—This article would be useful for packing meat and other substances liable to decay. It can be prepared by fusing five parts stearic acid at a gentle heat, mixing well with two parts carbolic acid and five parts melted paraffine, and stirring until the whole has become solid, and applying in the same manner as wax paper is made.

MELON MANGOES.—The late, small, and smooth muskmelons are used for this pickle. Cut out a plug at the stem end, or, as some prefer it, from the side; scrape out the contents, replace the plug and secure it with a wooden pin, and put the melons thus prepared into a strong brine. When they have been in the brine for twenty-four hours or more, they are ready for stuffing. The stuffing is made of any pickle material at hand; shredded cabbage, broken cauliflower, small onions and cucumbers, green beans, peppers, mustard seed, nasturtiums, scraped horseradish, and the like. Cabbage and the other stuffing, except the aromatics, are better for being scalded and cooled. Stuff the melons according to fancy, and then sew each plug in its place by means of a needle and coarse thread. Place the stuffed melons in a jar, add cloves, pepper, and other desired spice, and pour boiling vinegar over them. Repeat the scalding of the vinegar for three days in succession.

MILK, To Preserve.—1. Milk becomes sour by the formation of lactic acid, which is rapidly developed at a temperature of 70° to 90°. The best way to preserve milk sweet for domestic purposes, is to add to it every day a few grains of carbonate of soda per pint, to keep the milk alkaline.—2. Put the milk into bottles, then place them in a saucepan with cold water, and gradually raise it to the boiling point; take it from the fire, and instantly cork the bottles, then raise the milk once more to the boiling point for half a minute. Finally let the bottles cool in the water in which they were boiled. Milk thus treated will remain perfectly good for six months. Emigrants, especially those having children, will find the above hint add much to their comfort while on their voyage.—3. Add to every thirty ounces of unskimmed milk, previously poured in a well-annealed glass bottle, about six grains of bicarbonate of soda. Place the bottle containing the milk, and well corked, for about four hours in a water-bath heated up to 90° C. (194° F.). On being taken out the bottle is varnished over with tar; and in that state the milk will keep sound and sweet for several weeks.

MILK, Condensed.—There is no patent for manufacturing condensed milk, and the whole process amounts to a careful evaporation, addition of sugar and sealing up of the article. The evaporation should be conducted in a vacuum, to prevent the milk from becoming brown and acquiring a bitter taste. It is best to stir it constantly, or the skin of coagulated casein at the top will prevent quick evaporation. When sufficiently thick or condensed it is mixed with one-quarter of its weight of granulated sugar, stirred well, filled in tins, and soldered up.

MUSHROOMS, To Pickle.—Take a quart of small field button mushrooms, cut the stems close, and rub off the skin with a bit of flannel

and a little salt; throw them as they are done into salt and spring water. Drain and dry them in a cloth. Put a quart of strong vinegar into an enameled pan, with an ounce of bruised ginger, half an ounce of whole white pepper, half an ounce of mustard seed. Tie up in a bit of muslin a small nutmeg sliced, and half a tablespoonful of cayenne; put this along with a tablespoonful of salt into the vinegar, and let it and the spices come to a boil. When boiling briskly throw in the mushrooms, and let them boil ten minutes. Take out the muslin bag, and put the other spices into the pickle bottles, along with the mushrooms and vinegar. When quite cold, cork the bottles, and cover them with a bladder.

MUSHROOMS, To Preserve.—The small open mushrooms suit best. Trim and rub them clean, and put into a stew-pan a quart of the mushrooms, three ounces of butter, two tablespoonfuls of salt, and half a teaspoonful of Cayenne pepper and mace mixed; stew until the mushrooms are tender; take them carefully out and drain them on a sloping dish. When cold, press into small pots, and pour clarified butter over them. Put writing paper over the butter, and on that pour melted suet, which will exclude the air and preserve them for many weeks, if kept in a dry, cool place.

ONIONS, To Keep.—Gather in fall and remove the tops; then spread upon a barn floor or in any open shed, and allow them to remain there until thoroughly dry. Put into barrels or small bins or boxes, and place in a cool place, and at the approach of cold weather cover with straw or chaff, if there is danger of very severe freezing.

Onions are often injured in winter by keeping them in too warm a place. They will seldom be injured by frost if kept in the dark, and in tight barrels or boxes, where not subjected to frequent changes of temperature. It is the alternate freezing and thawings that destroy them, and if placed in a position where they will remain frozen all winter, and then thawed out slowly and in a dark place, no considerable injury would result from this apparently harsh treatment. Onions should always be stored in the coolest part of the cellar, or put in chaff and set in the barn or some out-house.

ONIONS, To Pickle.—Have the onions gathered when quite dry and ripe, and with the fingers take off the thin outside skin, then with a knife remove one more skin, when the onion will look quite clear. Have ready some very dry bottles or jars, and as fast as the onions are peeled put them in. Pour over sufficient cold vinegar to cover them, add two teaspoonfuls of allspice and two teaspoonfuls of black pepper, taking care that each jar has its share of the latter ingredients. Tie down with bladder, and put them in a dry place, and in a fortnight they will be fit for use. This is a most simple receipt, and very delicious, the onions being nice and crisp. They should be eaten within six or eight months after being done, as the onions are liable to become soft.

ORANGE-PEEL, Candied.—Soak the peels in water, which must be changed, until they lose their bitterness, then put them into syrup until they become soft and transparent; lastly, take them out and place them to dry.

OYSTER CATSUP.—Take fine fresh oysters, rinse them in their own liquor, then pound them

in a marble mortar, and to a pint of oysters put a pint of cherry wine; boil them up, add an ounce of salt, 2 drachms of cayenne pepper, let it boil up once again, rub it through a sieve; when cold, put it in bottles and cork and seal them.

OYSTERS, Pickled.—Take one hundred freshly opened oysters and simmer them slowly in their own liquor; when the beards begin to curl, take them out one by one and put them in a pan containing ice water, (cooling rapidly renders them firm). Strain the liquor and return to the kettle, then add one ounce of whole allspice, the same of pepper, a few blades of mace, and half a teaspoonful of salt. Simmer five minutes and add one pint of vinegar (not too strong). Then boil about two minutes longer. When the liquor becomes cold, pour it over the oysters. Ready for use in twelve hours.

PARSLEY, To Dry.—Cut a large basketful of the best looking curled parsley, pick out all faded or dirty leaves, and dry the remainder carefully before a clear fire. At first the leaves will become quite limp, and they must be turned before the fire to expose all parts equally to the heat, until the leaves are dry and brittle, without losing their green color, for if they are allowed to get brown they are spoiled. When dry, rub them to powder between the hands; sift the powder through a coarse sieve, and bottle it for use; it will retain both the color and flavor of green parsley. A large basket of fresh leaves will hardly yield a pint of powder. Never dry it in the sun, or it will lose much of its flavor.

PARSNIPS, Preserving.—The almost universal practice among farmers is to allow their parsnips to remain in the ground through winter, just where they were grown. We believe the quality of this root is improved by being frozen, or at least kept cool, but it is not necessary to leave them in the open garden during winter, where, if the ground remain frozen, they cannot be got at until it thaws in spring, and then used in a very few weeks or not at all. If the roots are dug up late in the fall, leaving all the tops on, then carefully heeled in thickly together in rows, after which cover with a little coarse litter, they can be reached whenever wanted during winter.

PEACHES, To Can.—Pare and halve your peaches. Pack them as closely as possible in the can without any sugar. When the can is full, pour in sufficient pure cold water to fill all the interstices between the peaches, and reach the brim of the can. Let stand long enough for the water to soak into all the crevices—say six hours—then pour in water to replace what has sunk away. Seal up the can, and all is done. Canned in this way, peaches retain all their freshness and flavor.

There will not be enough water in them to render them insipid. If preferred, a cold syrup could be used instead of pure water, but the peaches taste most natural without any sweet.

PEACHES, To Dry.—Never pare peaches to dry. Let them get mellow enough to be in good eating condition, put them in boiling water for a moment or two, and the skins will come off like a charm. Let them be in the water long enough, but no longer. The gain is at least six-fold—saving of time in removing the skin, great saving of the peach, the part of the peach saved is the best part, less time to stone the peaches,

less time to dry them, and better when dried. A whole bushel can be done in a boiler at once, and then the water turned off.

PEACHES, To Preserve.—Take moderate-sized peaches before they are quite ripe, cut a small slit in the end and take out the stone, set them to boil in cold water, and let them remain till about half done, then throw them into an earthen pan containing cold water. The next day put them into a preserving-pan, with as much of the syrup (prepared as above) as will cover them, let them boil for five minutes, then lay them aside till next day in an earthen-ware pan; boil them three days successively in the same syrup, which at the end of that time ought to be rather thicker than honey; if it does not appear to be so, boil it until it is thick enough.

PEAS (Green), To Preserve.—When full grown, but not old, pick and shell the peas. Lay them on dishes or tins in a cool oven, or before a bright fire; do not heap the peas on the dishes, but merely cover them with peas, stir them frequently, and let them dry very gradually. When hard, let them cool, then pack them in stone jars, cover close, and keep them in a very dry place. When required for use, soak them for some hours in cold water, till they look plump before boiling; they are excellent for soup.

PICCALILLI (Indian Method).—This consists of all kinds of pickles mixed and put into one large jar—sliced cucumbers, button onions, cauliflowers, broken in pieces. Salt them, or put them in a large hair sieve in the sun to dry for three days, then scald them in vinegar a few minutes; when cold put them together. Cut a large white cabbage in quarters, with the outside leaves taken off and cut fine; salt it, and put it in the sun to dry three or four days; then scald it in vinegar, the same as cauliflower; carrots, three parts, boiled in vinegar and a little bay salt. French beans, radish pods, and nasturtiums, all go through the same process as capsciums, etc. To 1 gallon of vinegar put 4 ounces of ginger bruised, 2 ounces of whole white pepper, 2 ounces of allspice, $\frac{1}{2}$ ounce chillies bruised, 4 ounces of turmeric, 1 pound of the best mustard, $\frac{1}{2}$ pound of shallots, 1 ounce of garlic, and $\frac{1}{2}$ pound of bay salt. The vinegar, spice, and other ingredients, except the mustard, must boil half an hour; then strain it into a pan, put the mustard into a large basin, with a little vinegar; mix it quite fine and free from lumps, then add more. When well mixed put it into the vinegar just strained off, and when quite cold put the pickles into a large pan, and the liquor over them; stir them repeatedly, so as to mix them all. Finally, put them into a jar, and tie them over first with a bladder, and afterwards with leather. The capsciums want no preparation.

PICKLES, Hints on.—Some time since it appeared to be the fashion that all pickles should have a bright green color, almost brighter than the pickled vegetable itself possessed when quite fresh, or even when growing under the most favorable circumstances. All vegetables, when subjected to the influence of heat, lose a considerable portion of their natural coloring matter, or it undergoes some chemical change, which renders the color faded and sometimes withered in appearance; if therefore pickles must be bright green, they must be colored, and the most common way in which that was done was by letting them lie in a copper vessel. The vinegar with

which they were covered absorbed some portion of the copper, and gave a green tinge (which, however, was highly poisonous) to the pickle. So many accidents occurred from the use of these green pickles that the fashion declined, and makers who advertise pickles have ceased to mention their green color as one of their recommendations.

The vegetables intended for pickling are in most cases put either into salt or strong brine for a few days, to extract some of the fluid which all vegetables contain, and which would so much weaken the vinegar that it would have to be renewed in a very short time. Vinegar for pickles must be the best French white wine vinegar, and the spices, (which should be the best and freshest that can be procured) may be tied up in a muslin bag and boiled in the vinegar until all the flavor has been extracted by it. An enameled pan is the best and safest thing to boil any strong acid in.

PICKLES of Sweet Citron.—Cut the citron into pieces of desirable shape and size, then place them in a jar (stone is best), cover them with a weak brine and let them stand for twenty-four hours, then drain or wipe them dry. Take enough good vinegar to nearly or quite cover them. To every gallon of vinegar add one and one fourth pounds of nice brown or white sugar, one ounce each of whole cloves, allspice, stick cinnamon and mace. Boil the vinegar, sugar and spices together a few minutes and then pour over the citron. Let the whole stand two or three days, then repeat the scalding. After another day or two boil the whole together until the citron is done enough to pass a straw through. Keep in a cool, dry place.

PICKLES, Cucumber.—Cucumbers should be cut from the vines, a part of the stem left on; observe care not to mar them; if bruised they will decay. Select such as are of suitable size and of good quality, and cover them with boiling water, let them remain until the water is cool; if for vinegar pickles, add a small quantity of salt before scalding. When cold, drain thoroughly, and cover with boiling vinegar with an addition of spice if preferred. If for brine, put a layer of dry salt in the bottom of a barrel, and after thoroughly draining the pickles, put them in with dry salt amongst them. Add no water. Put a weight upon them, they will furnish moisture for brine, and will keep better, besides being more crisp and brittle for having had the gum soaked from them by the boiling water.

PICKLES, To Detect Copper in.—Put a few leaves of the tea, or some of the pickle cut small, into a phial with two or three drachms of liquid ammonia, diluted with one half the quantity of water. Shake the phial, when, if the most minute portion of copper be present, the liquid will assume a fine blue color.

PICKLE, French.—Take one peck of green tomatoes cut in thin slices. Take a layer of tomatoes and sprinkle salt upon it, and so on alternately until the whole peck is disposed of. Let them remain in this condition over night, and in the morning squeeze them out dry. Then take two heads of slough cabbage cut up fine, one dozen large green peppers cut fine, one-fourth of a peck of chopped onions; then add one half of a pound of whole mustard, one half of a pound of white pepper, and one half of a pound of sugar, and two ounces of whole, two

ounces of celery seed; mix all together and cover with vinegar and boil two hours.

PICKLE, Indian.—Pull a white cauliflower into branches, peel the stalk and slice it; slice a small white cabbage, a cucumber, a dozen onions, and six tomatoes; add six cloves of garlic, one dozen shallots, a dozen capsicums, half a pint of French beans, some radish pods, and a large handful of scraped horseradish. Lay all these vegetables in a pan, and pour over them strong boiling brine. Let them lie half an hour, then drain off the brine, and dry them in the sun, or in a cool oven. Boil one gallon of vinegar with four ounces of pounded black pepper, four ounces of pounded white pepper, two ounces of pounded chillies, two ounces of pounded ginger, one ounce of pounded cloves, four ounces of mustard flour, two ounces of turmeric, and one ounce of mustard seed. Lay the vegetables in a stone jar, pour the vinegar and spices while boiling hot over them, and when cold, cover the jar with a bladder. In a month it will be fit for use.

PICKLES, Mixed.—Take half a pint of half-grown French beans, as nearly of the same size as possible, a dozen gherkins, each from two to three inches long, a small green cucumber cut into slices about half an inch thick; put these into a pan of brine, strong enough to float an egg. Let them lie for three days, stirring them each day, then place them in an enameled preserving pan, with vine leaves under and over them, pour in the brine in which they have been steeped, and cover them closely to prevent the steam escaping; set them over a slow fire, but do not allow them to boil; when they become a green color, drain them through a sieve and let them remain till the other ingredients are ready. Pull a small white cauliflower into branches, and lay it in strong brine, together with half a pint of onions, the size of marbles, peeled, a dozen fresh chillies (scarlet), or a few scarlet capsicums; let them remain three or four days, then arrange them in pickle bottles with the green pickle already done interspersed in a tasteful manner through them. Boil as much good vinegar as will be sufficient to fill up the bottles, with some whole allspice, white pepper, bruised ginger, mace, mustard seed, and slices of horseradish. When the vinegar tastes very strong of these spices, strain it carefully (unless they have been tied in a bag as already recommended). Let the vinegar stand till cold, then fill the bottles and cork securely.

PLANT SPECIMENS, Preservation of.—The collector of plants requires but little apparatus; a few quires or reams of unsized paper, of folio size, will furnish all that will be needed. The specimens as gathered may be placed in a tin box, or, still better, in a portfolio of paper, until reaching home. About forty or fifty sheets of the paper should be put into the portfolio on setting out on an excursion. Put the specimens of each species in a separate sheet as fast as gathered from the plant, taking a fresh sheet for each additional species. On returning to camp, place these sheets (without changing or disturbing the plants) between the absorbent drying papers in the press, and draw the straps tight enough to produce the requisite pressure. The next day the driers may be changed, and those previously used laid in the sun to dry; this to be continued until the plants are perfectly dry. If paper and opportunities of transportation be limited, several

specimens from the same locality may be combined in the same sheet after they are dry.

Place in each sheet a slip of paper having a number or name of locality written on it corresponding with a list kept in a memorandum book. Record the day of the month, locality size, and character of the plant, color of flower, fruit, etc.

If the stem is too long, double it or cut it into lengths. Collect, if possible, half a dozen specimens of each kind. In the small specimens, collect the entire plant so as to show the root.

In many instances, old newspapers will be found to answer a good purpose both in drying and in keeping plants, although the unprinted paper is best—the more porous and absorbent the better.

When not traveling, pressure may be most conveniently applied to plants by placing them between two boards, with a weight of about 50 pounds laid on the top.

While on a march, the following directions for collecting plants, drawn up by Major Rich, are recommended:

Have thick cartridge or envelope paper, folded in quarto form, and kept close and even by binding with strong cord; newspapers will answer, but are liable to chafe and wear out; a few are very convenient to mix in with the hard papers as driers. This herbarium may be rolled up in the blanket while traveling, and placed on a pack animal. The specimens collected along the road may be kept in the crown of the hat when without a collecting-box, and placed in paper at noon or at night. Great care should be taken to keep the papers dry and free from mold. When there is no time at noon to dry the papers in the sun, they should be dried by night by the fire, when, also, the dried specimens are placed at the bottom of the bundle, making room on top for the next day's collection. A tin collecting-box is very convenient; plants may be preserved for two or three days in one if kept damp and cool. It is also convenient in collecting land-shells, which is generally considered part of a botanist's duty. A collector should also always be provided with plenty of ready-made seed-papers, not only for preserving seeds, but mosses and minute plants. Many seeds and fruits cannot be put in the herbarium, particularly if of a succulent nature, causing moldiness, and others form irregularities and inequalities in the papers, thus breaking specimens and causing small ones and seeds to drop out. Fruits of this kind should be numbered to correspond with the specimen, and kept in the saddle-bags or some such place. It is necessary, in order to make good specimens, to avoid heavy pressure and keep the papers well dried, otherwise they get moldy, turn black, or decay.

The seeds and fruits of plants should be procured whenever practicable, and slowly dried. These often serve to reproduce a species otherwise not transportable or capable of preservation.

On board ship, it is all-important to keep the collections from getting wet with salt water. The papers can generally be dried at the galley. The whole herbarium should be exposed to the sun as often as possible, and frequently examined, and the mold brushed off with a feather or camel-hair pencil.

In collecting algae, coralines, or the branched, horny, or calcareous corals, care should be taken to bring away the entire specimen with its base

or root. The coarser kinds may be dried in the air (but not exposed to too powerful a sun), turning them from time to time. These should not be washed in fresh water, if to be sent any distance. The more delicate species should be brought home in salt water, and washed carefully in fresh, then transferred to a shallow basin of clean fresh water, and floated out. A piece of white paper of proper size is then slipped underneath, and raised gently out of the water with the specimen on its upper surface. After finally adjusting the branches with a sharp point or brush, the different sheets of specimens are to be arranged between blotters of bibulous paper and cotton cloth, and subjected to gentle pressure. These blotters must be frequently changed till the specimens are dry.

PLANTS, To Preserve with their Natural Appearance.—Fine white quartz sand is heated to about 200° F. in an iron pot, and by stirring, some stearic acid and spermaceti, each in the proportion of half a drachm for every five pounds of sand, incorporated with it. Taken from the fire the whole is thoroughly mixed and used as follows: A cigar box with a draw lid, with the bottom knocked out, is inverted, and a coarse piece of wire gauze placed inside over the lid, which now forms the bottom. The bottom and this sieve are then covered by a layer of the prepared sand; the plants properly trimmed are placed on this sand, and completely imbedded in more of it so as to keep them properly in position. The box, covered with paper, is then placed in a room in which a temperature of 100° to 110° F. is kept up, in which the plants will soon be dried. When this point is reached, the lid of the box is drawn, which causes all the sand to fall out, leaving the dried plants on the gauze.

PLUMS, To Preserve.—Cut your plums in half (they must not be quite ripe), and take out the stones. Weigh the plums, and allow a pound of loaf-sugar to a pound of fruit. Crack the stones, take out the kernels, and break them in pieces. Boil the plums and kernels very slowly for about fifteen minutes, in as little water as possible. Then spread them on a large dish to cool, and strain the liquor. Next day make your syrup. Melt the sugar in as little water as will sufficiently dissolve it (about a gill of water to a pound of sugar), and boil it a few minutes, skimming it till quite clear. Then put in your plums with the liquor, and boil them fifteen minutes. Put them in jars, pour the juice over them warm, and tie them up when cold, with brandy paper. Plums for common use are very good done in treacle. Put your plums into an earthen vessel that holds a gallon, having first slit each plum with a knife. To three quarts of plums put a pint of treacle. Cover them, and set them on hot coals in the chimney corner. Let them stew for twelve hours or more, occasionally stirring them and renewing the coals. The next day put them up in jars. Done in this manner, they will keep till the next Spring. Syrups may be improved in clearness by adding to the dissolved sugar and water some white of egg very well beaten, allowing the white of one egg to two pounds of sugar. Boil it very hard (adding the egg shell), and skim it well, that it may be quite clear before you put in your fruit.

PLUM CHEESE.—Put a quantity of plums into a jar, and stand the jar in a saucepan of water on the fire; when quite soft pulp them

through a sieve, and to every pound of pulp, add one pound of loaf sugar, and one ounce of sweet almonds, blanched and pounded, with four bitter almonds; boil all together till the fruit will form a stiff jelly. If the plums are very juicy, some of the juice may be taken off the fruit.

POTATOES, Storing.—Potatoes should not be exposed to the sun and light any more than is necessary to dry them after digging them from the hill. Every ten minutes of such exposure, especially in the sun, injures their edible qualities. The flesh is thus rendered soft, yellowish or greenish, and injured in flavor. Dig them when dry, and put them in a dark cellar immediately and keep them there till wanted for use, and there would not be so much fault found about bad quality. This is also a hint to those grocers and marketmen who keep their potatoes in barrels in the sun—that is, if they wish to furnish their customers with a good article.

POTATOES, To keep from sprouting.—To keep potatoes intended for the use of the table from sprouting until new potatoes grow, take boiling water, pour into a tub, turn in as many potatoes as the water will entirely cover, then pour off all the water, handle the potatoes carefully, laying up in a dry place on boards, only one layer deep, and see if you do not have good potatoes the year round, without hard strings and watery ends caused by growing.

POTATOES (Sweet), Storing.—Farmers who store sweet potatoes for winter use should be very careful not to keep them too moist, too warm or too cold. A very good way is to get a box large enough for the quantity you have, and then select sand and dry it thoroughly before using; when dry, cover the bottom of your box with the sand to the depth of three inches, and then place one layer of sweet potatoes, but not so close as to lie against each other; then one layer of sand of the same depth, and so on until your box is full; then place it in a room where the temperature will not fall below 40°, nor rise above 60°. In this way they may be kept until new ones are to be had.

PUMPKINS, Drying.—Take the ripe pumpkins, pare, cut into small pieces, stew soft, mash and strain through a colander, as if for making pies. Spread this pulp on plates in layers not quite an inch thick; dry it down in the stove oven, kept at so low a temperature as not to scorch it. In about a day it will become dry and crisp. The sheets thus made can be stowed away in a dry place, and they are always ready for use for pies or sauce. Soak the pieces over night in a little milk, and they will return to a nice pulp, as delicious as the fresh pumpkin. The quick drying after cooking prevents any portion from slightly souring as is always the case when the uncooked pieces are dried; the flavor is much better preserved, and the after cooking is saved.

QUINCES, To Preserve.—1. Wipe the fruit and remove all defects, then pare, quarter and core. Boil the parings and cores in water an hour or more and strain through a colander. In this liquid, which is very glutinous, boil the fruit until easily pierced with a fork. The fruit should be weighed before cooking. To each pound of fruit add half a pound of white coffee sugar and boil only a few moments, when they are ready for canning. If more juice is desired, add water to the last cooking. A mold may form on the top, but it does not hurt them in the least,

and is easily removed when they are used. This process requires time.—2. Pare and core the quinces and cut them in halves or quarters, according to size. To four pounds of quinces allow four pounds of best white crushed sugar, and a pint of cold water. Put the quinces into a preserving kettle and pour the water over them, and spread half the sugar over the top; let them heat slowly, and boil until you can run a fork easily through them; keep closely covered, and do not stir them; when soft take each piece out separately and place on a platter to cool. Then strain the syrup, put in the rest of the sugar and boil it, closely covered without stirring, half an hour or more, when it is a red color and almost a jelly; do not remove the cover until it is taken from the fire. Let the fruit and syrup remain separate until the next day, then put a layer of each alternately into your jars and seal them. In this way they will not grow hard and tough.

RHUBARB, To Dry.—The best method of drying rhubarb is to strip it of its epidermis. This is a long operation, but both time and expense are spared in the end by the promptness and regularity of the drying. Many cultivators of rhubarb on a large scale have repeated the experiment and have met with the most decisive results.

RHUBARB PRESERVE.—Peel and cut into pieces about two inches long, six pounds of rhubarb. Put it into a stone jar, with eight pounds of preserving sugar, the rind of a lemon cut thin, and shred into little bits, a quarter of a pound of ginger, and a few cloves; set the jar in a pan of boiling water, or stand it in the oven. When the rhubarb is quite tender, strain off the juice; put the juice into a preserving pan, and boil quickly for half an hour; pour it over the rhubarb, and put the whole into pots or shapes; if well made it will be clear, and stiff enough to turn out, and covered in pots, it will keep as well as any other preserves.

ROOTS, To Dry.—They should be rubbed in water to get rid of the dirt and also some of the mucous substance that would otherwise render them moldy; the larger are then to be cut, split, or peeled, but in most aromatic roots, the odor residing in the bark, they must not be peeled; they are then to be spread on sieves or hurdles and dried in a heat of about 120° Fahr. either on the top of an oven, in a stove, or a steam closet, taking care to shake them occasionally to change the surface exposed to the air. Thick and juicy roots, as rhubarb, briony, peony, water-lily, etc., are cut in slices, strung upon a thread and hung in a heat of about 90° to 100° Fahr. Squills are scaled, threaded and dried round the tube of a German stove, or in a hot closet. Rhubarb should be washed to separate that mucous principle which would otherwise render it black and soft when powdered. Potatoes are cut in slices and dried.

ROOTS, To Preserve.—These are preserved in different ways, according to the object in view. Tuberous roots, as those of the dahlia, pæonia, tuberose, etc., intended to be planted in the succeeding spring, are preserved through the winter in dry earth, in a temperature rather under than above what is natural to them. So may the bulbous roots of commerce, as hyacinths, tulips, onions, etc., but for convenience, these are kept either loose, in cool dry shelves or lofts, or the finer sorts in papers, till the season of planting.

Roots of all kinds may be preserved in an ice-house till the return of the natural crop.

After stuffing the vacuities with straw, and covering the surface of the ice with the same material, place on it case boxes, casks, baskets, etc., and fill them with turnips, carrots, beet-roots, and in particular potatoes. By the cold of the place vegetation is so much suspended that all these articles may be thus kept fresh and uninjured till they give place to another crop in its natural season.

ROSEBUDS, To Preserve.—A method employed in Germany to keep rosebuds fresh into the winter, consists in first covering the end of the recently cut stem with wax, and then placing each one in a closed paper cap or cone, so that the leaves do not touch the paper. The cap is then coated with glue, to exclude air, dust, and moisture, and when dry it is stood up in a cool place. When wanted for use, the bud is taken out of the cap and placed in water, after cutting off the end, when the rose will bloom in a few hours.

SAUERKRAUT, To Make.—In the first place, let your "stand," holding from half a barrel to a barrel, be thoroughly scalded out; the cutter, the tub and the stamper also well scalded. Take off all the outer leaves of the cabbages, halve them, remove the heart and proceed with the cutting. Lay some clean leaves at the bottom of the stand, sprinkle with a handful of salt, fill in half a bushel of cut cabbage, stamp gently until the juice just makes its appearance, then add another handful of salt, and so on until the stand is full. Cover over with cabbage leaves, place on top a clean board fitting the space pretty well, and on top of that a stone weighing twelve or fifteen pounds. Stand away in a cool place, and when hard freezing comes on remove to the cellar. It will be ready for use in from four to six weeks. The cabbage should be cut tolerably coarse. The Savoy variety makes the best article, but it is only half as productive as the Drumhead and Flat Dutch.

SUET, To Keep.—Suet may be kept a year, thus: Choose the finest and most free from skin or veins, remove all traces of these, put the suet in the saucepan at some distance from the fire, and let it melt gradually; when melted pour it into a pan of cold spring-water; when hard, wipe it dry, fold it in white paper, put it in a linen bag, and keep it in a cool, dry place; when used, it must be scraped, and it will make an excellent crust with or without butter.

TOMATOES, Canning.—The most thorough and reliable mode of canning tomatoes is as follows: They are just sufficiently steamed, not cooked, to scald or loosen the skin, and are then poured upon tables and the skin removed, care being taken to preserve the tomato in as solid a state as possible. After being peeled, they are placed in large pans, with false bottoms perforated with holes, so as to strain off the liquid that emanates from them. From these pans they are carefully placed by hand into the cans, which are filled as solidly as possible—in other words, all are put in that the cans will hold. They are then put through the usual process and hermetically sealed. The cans, when opened for use, present the tomato not only like the natural vegetable in taste and color, but also in appearance; and moreover, when thus sealed, they are warranted to keep in any climate, and when opened,

will taste as naturally as when just plucked from the vine.

TOMATO CATSUP.—Take perfectly ripe tomatoes $\frac{1}{2}$ bushel; wash them clean and break to pieces; then put over the fire and let them come to a boil, and remove from the fire; when they are sufficiently cool to allow your hands in them, rub through a wire sieve; and to what goes through, add salt 2 tea-cups; allspice and cloves, of each, ground, 1 tea-cup; best vinegar 1 qt. Put on to the fire again and cook 1 hour, stirring with great care to avoid burning. Bottle and seal for use. If too thick when used, put in a little vinegar. If they were very juicy they may need boiling over an hour.

TOMATO FIGS.—1. Collect a lot of ripe tomatoes about one inch in diameter, skin, and stew them in the usual manner; when done, lay them on dishes, flatten them slightly, and spread over them a light layer of pulverized white or best brown sugar; expose them to a summer's sun, or place them in a drying house; when as dry as fresh figs, pack in old fig or small boxes, with sugar between each layer. If properly managed, the difference cannot be detected from the veritable article.—2. Pour boiling water over the tomatoes, in order to remove the skins; then weigh them, and place them in a stone jar, with as much sugar as you have tomatoes, and let them stand two days; then pour off the syrup, and boil and skim it until no scum rises. Then pour it over the tomatoes, and let them stand two days, as before; then boil and skim again. After the third time, they are fit to dry, if the weather is good; if not, let them stand in the syrup until drying weather. Then place on large earthen plates or dishes, and put them in the sun to dry, which will take about a week, after which pack them down in small wooden boxes, with fine white sugar between every layer. Tomatoes prepared in this manner will keep for years.

TOMATO (Green) Pickle.—1. Slice and steam till they begin to soften, take from the steamer and put in jars, add a little salt, about a teacupful of sugar, half of a spoonful of pepper, cloves and cinnamon each, one-fourth of a spoonful of spice, some whole mustard seed and slice one or two good sized onions with it; cover the whole with vinegar and let stand twenty-four hours; then scald the liquid and when cold it is ready for use. The seasoning is for one gallon.—2. Slice 1 peck green tomatoes; take 1 gallon vinegar, 6 tablespoonsful whole cloves, 1 of allspice, 2 of salt, 1 of mace, 1 of cayenne pepper; boil the vinegar and spices 20 minutes; put in the tomatoes and boil all together $\frac{1}{4}$ hour longer; when cold put in jars.

TOMATOES, Preserved.—Take of good ripe tomatoes, such a quantity as you wish to preserve, pare them, cut them in quarters, (if large ones,) place them in a stew pan with a little water, so they will not burn; being a very juicy fruit, they require to be cooked until the juice is nearly all out; then add white sugar—one pound to each pound of fruit; cook slowly one-half hour.

TOMATO SAUCE, To Keep.—Take six pounds of ripe tomatoes, crush them, and sprinkle with salt; let them remain a day or two, then boil and pass through a coarse sieve or colander. Put into the liquor half a teaspoonful of Cayenne and a dessertspoonful each of cloves, pepper, ginger, and cinnamon; boil it one-third away,

and bottle tight. It should be shaken before being used.

TRIPE, To Prepare and Pickle.—First sew it up, after it is turned inside out; be careful to sew it up tight, that no lime gets into it; now have a tub of lime-water, the consistence of good thick white-wash; let it remain in from 10 to 20 minutes, or until when you take hold of it, the dark outside skin will come off; then put it into clean water, changing three or four times to weaken the lime, that the hands be not injured by it; then with a dull knife scrape off all of the dark surface, and continue to soak and scrape several times, which removes all offensive substances and smell. After this, let it soak 20 or 30 minutes in 2 or 3 hot waters, scraping over each time; then pickle in salt and water 12 hours, and it is ready for cooking; boil from 3 to 4 hours, cut in strips to suit, and put it into nice vinegar with the various spices, as desired; renew the vinegar at the expiration of 1 week, is all that will be required further.

VEGETABLES, Keeping.—Sink a barrel two-thirds of its depth into the ground (a box or cask will answer a better purpose); heap the earth around the part projecting out of the ground, with a slope on all sides; place the vegetables that you desire to keep in the vessel; cover the top with a water tight cover; and when winter sets in, throw an armful of straw, hay, or something of that sort, on the barrel. If the bottom is out of the cask or barrel, it will be better. Cabbages, celery, and other vegetables, will keep in this way as fresh as when taken from the ground. The celery should stand nearly perpendicular, celery and earth alternating. Freedom from frost, ease of access, and especially freshness, and freedom from rot, are the advantages claimed.

VEGETABLES, Pickle for.—Six quarts of the very best vinegar, one pound of salt, a quarter of a pound of ginger, one ounce of mace, half a pound of shallots, one tablespoonful of cayenne pepper, two ounces of white peppercorns, and two ounces of mustard seed. Boil all these ingredients well together, and when cold put into a jar. You may add what green vegetables or fruit you like, provided they are fresh. They may be merely wiped to free them from dust.

WALNUT CATSUP.—Walnut-shell juice, 3 gallons; salt, 7 pounds; ginger, 8 ounces; shallots, 8 ounces; garlic, 8 ounces; horseradish, 8 ounces; essence of anchovies, 1 quart. Mix.

WALNUTS (White), To Pickle.—Pare green walnuts very thin till the white appears, then throw them into spring-water with a handful of salt; keep them under water six hours, then put them into a stewpan to simmer five minutes, but do not let them boil; take them out and put them in cold water and salt; they must be kept quite under the water with a board, otherwise they will not pickle white; then lay them on a cloth and cover them with another to dry; carefully rub them with a soft cloth, and put them into the jar, with some blades of mace and nutmeg sliced thin. Mix the spice between the nuts and pour distilled vinegar over them; when the jar is full of nuts pour mutton fat over them, and tie them close down with a bladder and leather, to keep out the air.

WORCESTERSHIRE SAUCE, (Lea and Perrin's).—White vinegar, 15 gals.; walnut cat-

sup, 10 gals.; Madeira wine, 5 gals.; mushroom catsup, 10 gals.; table salt, 25 lbs.; Canton soy, 4 gals.; powdered capsicum, 2 lbs.; powdered allspice, 1 lb.; coriander, powdered, 1 lb.; cloves, mace and cinnamon, of each $\frac{1}{2}$ lb.; assafetida, $\frac{1}{4}$ lb., dissolved in brandy, 1 gal. Twenty pounds of hogs' liver is boiled for 12 hours with 10 gallons of water, renewing the water from time to time. Take out the liver, chop it, mix with water, and work it through a sieve: mix with the sauce.

YEAST, To Preserve.—Common ale yeast may be kept fresh and fit for use several months by the following method: Put a quantity of it into a close canvas bag, and gently squeeze out the moisture in a screw-press till the remaining matter be as firm and stiff as clay. In this state it may be close-packed up in a tight cask, for securing it from the air, and will keep fresh, sound, and fit for use for a long time.

SOAP AND CANDLES.

ADULTERATION OF SOAP.—Soap is not exempted from the manipulation of fraud. Its external appearance often prevents the unpracticed eye from detecting the impurities it may contain, without further examination.

China clay is a common addition made to soap to increase its bulk. If a soap containing it be dissolved in hot water, one part of soap in ten of water, on allowing the solution to rest, the clay will be found at the bottom of the vessel, and its proportion in the soap ascertained.

Soap largely admixed with soluble glass (a solution of flint or silica in an excess of caustic soda) is very common in the market. Its weight is much greater than that of soap in its unadulterated state, and will usually show at once the probability of such an admixture, although such a soap may leave no sediment in a solution of it in hot water; but it is unsafe to employ it for washing fine fabrics, as it is apt to weaken them on account of the excess of alkali it imparts to the soap with which it is mixed.

From 10 to 30 per cent. of the silicate of soda is generally added. The soap feels somewhat hard and gritty in use. The soluble glass is introduced gradually into the pan after all the grease is in, and stirred actively until thoroughly mixed.

Soap is also sometimes contaminated with lime; this renders it partially insoluble in water, and makes it unfit for the laundry or the toilet.

ACID (Macquer's) Soap.—Castile soap, 2 pounds; water sufficient to render it soft; oil of vitriol, 1 ounce. Add the acid gradually, and keep rubbing them in a mortar, until the whole becomes of an equal consistence. Detergent.

ALMOND Soap.—Take oil of almonds, 7 pounds; soda, $1\frac{1}{4}$ pounds; water, sufficient quantity. The soda must be rendered caustic, before adding it to the oil, and heat must then be applied. An easy way of preparing the soda, is to treat it in solution, with powdered quicklime.

ALMOND (Bitter) Soap.—Take fine hard white soap, 100 pounds; essence of bitter almonds, $1\frac{1}{2}$ per cent. Treat them as for Cinnamon Soap.

ALMOND MEAL.—Ground almonds, 1 lb.; wheat flour, 1 lb.; orris root powder, $\frac{1}{4}$ lb.; otto of lemon, $\frac{1}{2}$ oz.; otto of almonds, $\frac{1}{4}$ drachm.

ALMOND PASTE.—Bitter almonds, blanched and ground, $1\frac{1}{2}$ lb.; rose-water, $1\frac{1}{2}$ pint; alcohol (60 o. p.), 16 ozs.; otto of berga-

mot, 3 ozs. Place the ground almonds and one pint of the rose-water into a stewpan; with a slow and steady heat, cook the almonds until their granular texture assumes a pasty form, constantly stirring the mixture during the whole time, otherwise the almonds quickly burn to the bottom of the pan, and impart to the whole an empyreumatic odor.

The large quantity of otto of almonds which is volatilized during the process, renders it essential that the operator should avoid the vapor as much as possible.

When the almonds are nearly cooked, the remaining water is to be added; finally the paste is put into a mortar, and well rubbed with the pestle; then the perfume and spirit are added. Before potting this paste, as well as honey paste, it should be passed through a medium fine sieve, to insure uniformity of texture, especially as almonds do not grind kindly.

Other pastes, such as Pate de Pistache, Pate de Cocos, Pate de Guimauve, are prepared in a similar manner to the above.

AMANDINE.—Fine almond oil, 7 lbs.; simple syrup, 4 oz.; white soft soap, or saponaceous cream, i. e., crème d'Amande, 1 oz.; otto of almonds, 1 oz.; otto of bergamot, 1 oz.; otto of cloves, $\frac{1}{2}$ oz. Rub the syrup with the soft soap until the mixture is homogeneous, then rub in the oil by degrees; the perfume having been previously mixed with the oil.

In the manufacture of amandine the difficulty is to get in the quantity of oil indicated, without which it does not assume that transparent jelly appearance which good amandine should have. To attain this end, the oil is put into "a runner," that is, a tin or glass vessel, at the bottom of which is a small faucet and spigot, or tap. The oil being put into this vessel is allowed to run slowly into the mortar in which the amandine is being made, just as fast as the maker finds that he can incorporate it with the paste of soap and syrup; and so long as this takes place, the result will always have a jelly texture to the hand. If, however, the oil be put into the mortar quicker than the workman can blend it with the paste, then the paste becomes "oiled," and may be considered as "done for," unless, indeed, the whole process be gone through again, starting off with fresh syrup and soap, using up the greasy mass as if it were pure oil. This liability to "go off" increases as the amandine nears the

finish; hence extra caution and plenty of "elbow grease" must be used during the addition of the last two pounds of oil. If the oil be not perfectly fresh, or if the temperature of the atmosphere be above the average of summer heat, it will be almost impossible to get the whole of the oil given in the formula into combination; when the mass becomes bright and of a crystalline luster, it will be well to stop the further addition of oil to it.

This and similar compounds should be potted as quickly as made, and the lids of the pots banded either with strips of tin-foil or paper, to exclude air. When the amandine is filled into the jars, the top or face of it is marked or ornamented with a tool made to the size of half the diameter of the interior of the jar, in a similar way to a saw; a piece of lead or tortoise-shell, being serrated with an angular file, or piece of an "old saw," will do very well; place the marker on the amandine, and turn the jar gently round.

ARSENICAL Soap.—From carbonate of potash, 12 oz.; white arsenic, white soap and air-slaked lime, of each, 4 oz.; powdered camphor, $\frac{3}{4}$ oz.; made into a paste with water, q. s. Used to preserve the skins of birds and other small animals.

ASSAY of Soap.—M. F. Schulze communicates to the *Journal de Pharmacie et de Chimie* a rapid and convenient method of estimating the value of soap. The method is the same as that adopted for estimating the hardness of potable water, i. e., it is based on the fact that lime water precipitates a solution of soap, yielding a liquor which does not give a persistent froth by agitation. The process is conducted as follows: A standard solution of lime is made by dissolving 1.6 grammes in water, with a little caustic soda, and making up the solution to one litre. Five grammes of the soap are weighed and dissolved in boiling water; the solution is allowed to cool, and is made up to a determinate volume, say 100 c. c. for soft soap, 200 c. c. for hard soap. Three c. c. of the standard lime solution are now added to 20 c. c. of distilled water, and to this diluted solution the soap liquor is added gradually from a burette. At first, the soap added is precipitated by the calcareous water, and a persistent froth is not produced by agitation; but, after a time, a point is reached at which the froth becomes persistent. The volume of soap solution requisite to produce this effect is then noted; the quantity is smaller the better the quality of the soap. If, moreover, an assay has been made on a sample of soap of standard value, a very exact appreciation of the value of any given sample of soap may be subsequently obtained by comparing the results.

BAYBERRY, or Myrtle Soap.—Dissolve 2 $\frac{1}{4}$ pounds of white potash in 5 quarts of water, then mix it with 10 pounds of myrtle wax, or bayberry tallow. Boil the whole over a slow fire till it turns to soap, then add a teacup of cold water; let it boil ten minutes longer; at the end of that time, turn it into tin moulds or pans, and let them remain a week or ten days to dry; then turn them out of the moulds. If you wish to have the soap scented, stir into it an essential oil that has an agreeable smell, just before you turn it into the moulds. This kind of soap is excellent for shaving, and for chapped hands; it is also good for eruptions on the face. It will be fit for use in the course of three or four weeks

after it is made, but it is better for being kept ten or twelve months.

BLACK Soap.—This is properly a crude soft soap made of fresh oil, tallow, and potash; but the following mixture is usually sold for it:—soft soap 7 lbs.; train oil 1 lb.; water 1 gallon; boil to a proper consistence, adding ivory black or powdered charcoal to color. Used by farriers.

BLEACHING Soap.—This is a soda soap prepared according to the excellent prescription of the Prussian pharmacopoeia, which prescription has been copied in almost all other works of the kind; the soap is separated by common salt, and after this one fourth of its weight of sulphite of soda is added, which has been previously made into a homogeneous paste by means of a little water; the soap is next dried in the usual manner. In order to apply this soap, chiefly intended for the bleaching of straw hats, but perfectly fit for application to silk and wool, it is dissolved in its own weight of cold water, and to every 2 lbs. of soap $\frac{1}{2}$ oz. of liquid ammonia is added. As soon as the mass has a gelatinous aspect, 1 part thereof is dissolved in 8 parts of warm water. The materials which it is desired to bleach are washed and scrubbed by means of a brush in this soap-suds; while yet moist, the materials are placed in acidulated water, (25 parts of water and 1 $\frac{1}{2}$ of hydrochloric acid,) left in this liquid for 2 hours, and then well washed, and rinsed with pure cold water, and dried.

CANDLES.—Candles are made of various materials, but the first operation, in all cases, is the preparation of the wicks. The best candle wicks are made of cotton rovings, imported from Turkey in skeins. 4 or more of these, according to the intended thickness of the wick, are wound on a reel, from which they are again run off, and cut of the proper lengths. They are then dipped into melted tallow, and after rubbing with the hands, are placed straight and allowed to harden. They are next arranged upon the broaches ready for dipping. For mould and other candles that do not undergo the process of dipping, this last operation is omitted. In some cases the wicks are formed by twisting or plaiting the cotton together, or winding it round wires, which are withdrawn after the candles are made, thus leaving the wicks hollow; this was the method patented by Gay Lussac, for his stearine candles. In some instances, the cotton is steeped in metallic solutions. The object in all these processes is to produce a wick that will consume itself, and thus prevent the necessity of snuffing. Great care is taken to select a cotton that will yield the least possible quantity of ashes, or non-volatile matter after burning.

CANDLES, Adamantine.—Adamantine candles are made of stearine, and stearine is made in two ways. One way is to boil common tallow with one-sixth of its weight of slaked lime until a lime soap is formed. The lime soap is put into another vessel and four parts of sulphuric acid for every three parts of the lime (previously used) mixed with it to get out the lime. It is heated and stirred until the fat all runs off and leaves nothing but sulphate of lime and water. The fat is now allowed to cool, is then shaved into thin slices, put into canvas bags and into a hydraulic press. Here the fluid portion is driven out and the stearine remains. This is again shaved and pressed. The cakes now left are

commercial stearine or stearic acid, an inflammable substance without any greasy feeling. The other method is to blow steam into cocoa-nut oil or palm oil and thus separate the glycerine from the fat. After the glycerine is taken away, the fat is allowed to cool and treated as above. No acid or lime is used in this process.

CANDLES, Composition.—These are generally made of a mixture of spermaceti and hard white tallow, to which a little bleached rosin is sometimes added. The origin of the application of the term "composite" or "composition" to candles, is somewhat laughable. A manufacturer who had a large stock of spermaceti candles on hand, of a dirty hue, and therefore unsalable, advertised them under the above name, and they were soon disposed of, from the supposition that they were composed of some new combination of materials.

CANDLES from Lard.—1. For twelve pounds of lard take one pound saltpetre and one pound of alum; mix them and pulverize them; dissolve the saltpetre and alum in a gill of boiling water; pour the compound into the lard before it is quite all melted; stir the whole until it boils; skim off what rises; let it simmer until the water is boiled out, or until it ceases to throw off steam; pour off the lard as soon as it is done, and clean the boiler while it is hot. If the candles are to be run you may commence immediately; if to be dipped, let the lard cool to a cake, and then treat it as you would tallow.—2. To every eight pounds of lard, add one ounce nitric acid, and the manner of making is as follows: having carefully weighed your lard, place it over a slow fire, or at least merely melt it; then add the acid, and mould the same as tallow, and you have a clear, beautiful candle. In order to make them resemble bona fide tallow candles, you have only to add a small proportion of pure beeswax.

CANDLES, Mineral.—Ozocerite is a mineral wax—chemically, a hydrocarbon—and, in its raw or native state, is of a yellowish color, of slight specific gravity, and somewhat fibrous in its structure. It will not burn of itself, but will readily melt on a light being applied to it. On being roughly wrapped around a central wick, even in its native state, it is easily and regularly consumed. In fact, a rude candle can be made of the raw material and a cotton wick. It is found principally in Austria, Moldavia, the Caucasus, and near the Caspian Sea, where it is obtained in great quantities, being largely used in those countries for illuminating purposes, and was discovered by a Russian military officer.

The substance is generally melted down for convenience of storage in transit, in which condition it forms a dark-colored mass, and is packed in barrels, the native or unmelted ozocerite being sent over in canvas bags.

To prepare it for use, it is first conveyed into melting-tanks, holding from two to three tons each, and where it is melted down by means of a steam coil. From these tanks the ozocerite is run off to a series of stills, holding from two to three tons each, in which it is distilled over partly by steam and partly by bottom heat. The dirt and bottoms from the crude ozocerite are run off from the melting-tanks into another set of tanks beneath them, where they are remelted, the finer products being afterward distilled over. The ozocerite comes over from the stills in the

form of an oily distillate, which is run from the condensers into moulds and allowed to cool. This gives a deep yellowish, wax-like substance of a spongy nature, the pores being filled with oil, which exudes under a slight pressure. These cakes are packed between oilskins and canvas cloths, and placed in hydraulic presses, of which there are three of large capacity. The pressed cake, after removal is put into reheating tanks and again melted down, and is pumped from these tanks by a steam pump into the acidifiers where it is treated with a sulphuric acid. These acidifiers are steam-jacketed, and are fitted with revolving agitators by which the ozocerite and acid are agitated together for a certain time, after which the mixture is allowed to settle. After settling, the purified ozocerite is drawn off from the lower part of the acidifiers—the acid remaining on the top—and run into vessels which are heated by bottom heat. This is the final heating, and from these vessels the fine stuff is drawn off into moulds, the result being a hard white wax, the melting-point of which is 140°, that of paraffine wax being only 128°. From this wax the candles are made.

In some cases, and under certain conditions which occasionally present themselves in the process of manufacture, the ozocerite, when separated from the acid, is washed with hot water. The water having been removed, the material is repeatedly filtered through animal charcoal, until the requisite degree of whiteness is obtained. There are also several specialties about the manufacture, which requires to be conducted with the greatest nicety and exactness, or the looked-for results may be entirely negated. One point is that of temperature, that attained in the stills being exceedingly high and variable with certain varying circumstances and at different stages of the process. Another point is the length of time during which the ozocerite is exposed to the action of the acid or of the charcoal. It is also important whether and when either the acid bath or the charcoal filter should be used. We should mention that there are several by-products, the chief of which is a very clear colorless oil, without smell, and of very high illuminating power.

The candles thus made have proved in every way equal to those made of the best wax, having only the drawback of smouldering and giving off an offensive smell when blown out. This, however, is not peculiar to them alone, as it is also a fault in wax candles, arising from the rapidity with which the wax cools. It may easily be obviated by using an old-fashioned extinguisher, or by coating the wick with some material harder than ozocerite.

CANDLES, Spermaceti.—Spermaceti, either alone or combined with hard white tallow, forms very good candles, but they will not bear carrying about in the hand without spilling the melted portion.

CANDLES, Stearint.—These are made of the stearine or stearic acid obtained from tallow, in the same way as other mould candles. They furnish a superior light, and burn a long time.

CANDLES, Tallow (By Dipping).—The broaches being covered with wicks, are arranged in frames ready for dipping. The dipping cistern being filled with tallow of a proper temperature from the boiler, one of the frames is placed upon the end of the dipping beam, and pressed down gently into the melted fat; it is next withdrawn,

the bottoms of the candles just touched against a board placed on one side of the cistern for the purpose, and then removed to the rack. Another is now taken and treated in the same manner, and the process is continued with fresh frames until those first dipped are sufficiently cool to undergo a second immersion. This operation is repeated until the candles acquire a sufficient size, when they are finally cooled, sorted, weighed, and strung in pounds for sale. The dipping beam is simply a piece of wood hung from the ceiling by the center, and arranged with weights at one end, and at the other with supports to receive the frames with the wicks. It is so balanced that a slight pressure with the fingers is sufficient to depress it so as to immerse the wicks or partly formed candles into the tallow of the dipping cistern. On withdrawing the pressure, the beam again assumes the horizontal position, and thus raises the candles out of the melted fat. The dipping-room, or shop, is usually situated in the coldest part of the premises, and furnished with a species of Venetian shutters throughout the entire length of walls, (if possible,) after the manner of breweries, to preserve a constant current of cool air.

CANDLES, Tallow (By Moulding).—Mould candles are made of the best kind of tallow; a mixture of 3 parts of sheep with 1 part of ox suet, both fresh, makes the most glossy and consistent candles. The moulds are made of pewter; the part answering to the bottom of the candle being left open, and a small hole at the top also left for the wick; eight or more of these moulds are fitted into a stool, the upper surface of which forms a kind of trough, the bottom part of the mould being upwards. The wicks are then introduced by putting a long wire, furnished with an eye or hook at one end, down through the mould, until it protrudes at the bottom, (or rather top,) when a wick is inserted and the needle is then immediately drawn back. As soon as all the moulds have received their wicks, a wire is run through the loop of each and then allowed to rest on the top of the moulds; the protruding portion of the wicks is next pulled tight, and properly arranged in the centers of the moulds. Melted tallow of a proper temperature is now poured into the trough-like part of the stool, until the moulds are all full. The wicks are again pulled tight, and the whole allowed to cool. When quite cold, the wire that held the wicks is withdrawn, and the candles pulled out one by one, by inserting a bodkin into the loop of the wick. The better class of moulds are then either bleached by exposing them to the dew and air for a few days, or by keeping them for a few weeks, until sufficiently whitened.

CANDLES, Tallow (For Summer use).—Most tallow, in summer, is more or less soft and often quite yellow. To avoid both, take your tallow and put a little bees-wax with it, especially if your bees-wax is dark and not fit to sell; put into a suitable kettle, adding weak lye and gently boil an hour or two each day for 2 days, stirring and skimming well; each morning cutting it out and scraping off the bottom which is soft, adding fresh lye (be sure it is not too strong) 1 or 2, or 3 gals., according to the amount of tallow. The third morning use water in which alum and saltpetre is dissolved, at the rate of 1 lb. each, for 30 lbs. of tallow; then simmer, stir, and skim again; let cool, and you

can take it off the water for use. They may be dipped or run in moulds; for dipping, allow two pounds for each dozen candles.

CANDLES, Wax.—These are made either by pouring melted wax over the wicks, or by applying the wax in a soft state with the hands, and afterwards rolling it smooth with a roller of polished box wood, upon a table formed of polished walnut wood. They are then cut and trimmed. The first part of this process is usually conducted over the cistern of melted wax, and the wicks are strung upon an iron hoop suspended from the ceiling.

CANDLES, Imitation Wax.—Purify melted tallow by throwing in powdered quick lime, then add two parts wax to one of tallow, and a most beautiful article of candle, resembling wax, will be the result. Dip the wicks in lime water and saltpetre on making. To a gallon of water add 2 ozs. saltpetre and $\frac{1}{2}$ lb. of lime: it improves the light, and prevents the tallow from running.

CANDLES, Wicks for.—Of late years the best candles are made in such manner that they do not require snuffing. The simplest way of effecting this is to make the wick with one strand of loosely twisted cotton, which will become slightly stretched when the wick is placed in the candle, but will contract again on its burning, removing the force that kept it extended. If this roving be placed at the outside of the wick, it is evident that when it contracts, it will pull the latter into a curved shape, and thus expose its upper part to the outer portion of the flame, as well as to the atmosphere, by which means it will be consumed with sufficient rapidity to prevent the necessity of using the snuffers. The same may be effected by placing the candle at an angle of about 45° , by which means the upper part of the wick will be out of the flame; but this plan, besides being unsightly, is liable to the risk of the tallow dropping beyond the candlestick. Platted wicks, so arranged that one portion shall be stretched more than another, have long been adopted for the same purpose.

CANDLE WICKS, Preparing.—There are several prescriptions for solutions to improve wicks, the best of which is the following: Borax, 2 ounces; chloride of calcium, chloride of ammonium, and saltpetre, 1 ounce each; then dissolved in three quarts of water and filtered; the wicks are soaked in this solution and then dried.

Another is: first steep the wicks in a solution of lime-water, in which saltpetre has been dissolved. To 1 gallon of water add 2 ounces saltpetre and $\frac{1}{2}$ pound lime. Dry well the wicks before using. It improves the light, and prevents the tallow from running.

CAMPBORATED Soap.—Sixteen ounces of white soap, eight ounces of boiling water, six ounces of olive oil and one drachm of powdered camphor; dissolve the soap in the water, evaporate slowly to the consistence of a soft paste, add the camphor incorporated with the oil, mix thoroughly and pour into moulds. It is excellent for chapped hands or lips and excoriations.

CARBOLIC ACID Soap.—Take freshly prepared cocoa-nut oil soap, 150 parts, and fuse; then add a solution of alcohol, 10 parts; carbolic acid, 6 parts; caustic potassa, 2 parts; oil of lemon, 1 part, and mix with stirring. To be poured into moulds.

CHEMICAL Soap, (For taking Oil, Grease, etc. from the cloth.)—Take 5 pounds Castile

soap, cut fine; 1 pint alcohol; 1 pint soft water; 2 ounces aqua fortis; $1\frac{1}{2}$ ounce lampblack; 2 ounces saltpetre; 3 ounces potash; 1 ounce camphor, and 4 ounces cinnamon, in powder. First dissolve the soap, potash, and saltpetre, by boiling; then add all the other articles, and continue to stir until it cools; then pour into a box and let it stand twenty-four hours and cut into cakes.

CHEMICAL SOFT SOAP.—Take grease, 8 lbs.; caustic soda, 8 lbs.; sal-soda, 1 lb.; melt the grease in a kettle, melt the sodas in soft water, 4 gals., and pour all into a barrel holding 40 gals. and fill up with soft water, and the labor is done. When the caustic soda cannot be obtained of soap-makers, you will make it by taking soda-ash and fresh slaked lime, of each eight pounds; dissolving them in the water with the sal-soda, and when settled, pouring off the clear liquid.

CHLORINATED SOAP.—From Castile soap (in powder), 11 ozs.; chloride of lime (dry and good), 1 oz.; mix, beat them to a mass with rectified spirit, q. s.; holding in solution oil of verbena or of ginger grass, $\frac{1}{4}$ oz.; lastly form the mass into flat tablets, and wrap these in thin sheet gutta percha. A most excellent detergent and stimulant soap in various affections, admirably adapted for hospital use, and for removing stains from the skin and rendering it white. It is the most powerful known agent against infection from contagious diseases communicated by contact.

CINNAMON SOAP.—Palm oil soap, 2 parts; good tallow soap, 3 parts. Reduce to shavings, then liquify by adding a little water, and placing the mixture in a water bath until perfectly united; next cool to about 135° Fahr., and add finely powdered yellow ochre to color, and a sufficiency of the following perfume: Essence of cinnamon, 7 parts; essence of bergamot, 2 parts; essence of sassafras, 1 part. Well mix the whole together and mould.

CITRON SOAP.—Curd soap, 6 lbs.; otto of citron, $\frac{1}{4}$ lb.; otto of verbena (lemon grass), $\frac{1}{2}$ oz.; otto of bergamot, 4 ozs.; otto of lemon, 2 ozs. One of the best fancy soaps that is made.

COLD SOAP.—Twenty-two pounds of soap, 20 pounds of grease, and $\frac{1}{4}$ of a pound of rosin. This quantity will make a barrel of soap. Keep the grease tried out and strained, so as to be ready for use when the requisite quantity is gained. Select the gray looking potash, put it into the soap barrel, pour on it hot soft water to facilitate dissolving; when softened put in the grease, reserving two or three pounds to melt the rosin in; keep adding hot water till it stirs readily and when nearly to the top put in the melted rosin and fat. This soap is good and strong, will keep any length of time and be free from insects. When wanted for use dip out a quantity and add a third of soft water to it. The dark potash is apt to stain the clothes in washing.

COSMETIC SOAP.—Take a pound of Castile soap, or any other nice old soap; scrape it fine; put it on the fire with a little water; stir it to a smooth paste; turn it into a bowl; when cold, add some lavender water, or any kind of essence; beat it with a silver spoon till well mixed; thicken it with Indian meal, and keep it in small pots, closely covered; exposure to the air will harden it.

EMULSIN AU JASMIN.—Saponaceous cream, 1 oz.; simple syrup, $1\frac{1}{2}$ oz.; almond oil, 1 lb.; best jasmine oil, $\frac{1}{2}$ lb.

EMULSIN A LA VIOLETTE.—Saponaceous cream, 1 oz.; syrup of violets, $1\frac{1}{2}$ oz.; best violet oil, $1\frac{1}{2}$ lb.

On account of the high price of the French oils these emulsions are expensive, but they are undoubtedly the most exquisite of cosmetics.

ENGLISH BAR SOAP.—Six gallons soft water; 6 lbs. good stone lime; 20 lbs. sal-soda; 4 ozs. borax; 15 lbs. fat (tallow is best); 10 lbs. pulverized rosin, and 4 ozs. bees-wax; put the water in a kettle on the fire, and when nearly boiling add the lime and soda; when these are dissolved, add the borax; boil gently, and stir until all is dissolved; then add the fat, rosin, and bees-wax; boil all gently until it shows flaky on the stick, then pour into moulds.

ERASIVE SOAP.—2 pounds of good Castile soap; $\frac{1}{2}$ pound of carbonate of potash; dissolved in $\frac{1}{2}$ pint hot water. Cut the soap in thin slices, boil the soap with the potash until it is thick enough to mould in cakes; also, add alcohol, $\frac{1}{2}$ ounce; camphor, $\frac{1}{2}$ ounce; hartshorn, $\frac{1}{2}$ ounce; color with $\frac{1}{2}$ ounce pulverized charcoal.

FAT (Animal), To Prepare for Soap Making.—Tallow, when exposed at common temperature in the air, gradually acquires an unpleasant, rank smell. This can be prevented by cutting it in slices, and boiling it in water containing for every one hundred pounds of fat (water, thirty-five to forty pounds), one quarter of a pound of alum, one half pound of salt; this is boiled together and strained; the cake of strained fat taken up and washed in clean water; then remelted at a low heat, and poured into a barrel containing twice as much water (by measure) as of the melted grease, and to this water add about ten per cent. of good clear sweet soap compared to the amount of grease, the water not to be more than blood-heat, and the temperature of the grease about the same. The whole is thoroughly stirred with a broad stick till cold, when it is allowed to rest and separate from the water, which is afterward withdrawn, and the fat remaining, in a granular state, completely drained, and finally dried in a current of dry air, is then transferred and packed in firkins, crocks or barrels.

Grained fat thus prepared, is kept sweet, and is also acted on by the lye with a far greater ease and rapidity, in consequence no doubt of its grain-like state, which enables the alkali in the lye to act upon a greater surface at once without requiring the boiling of the fat with the lye, and producing a soap free of rank smell, while the grained fat in suet may be preserved sweet for soap-making purposes for years, if thoroughly dried before packing away.

FLOATING SOAP.—Good oil soap $\frac{1}{2}$ cwt.; water $\frac{1}{2}$ gallon; melt by the heat of a steam or water bath in a pan furnished with an agitator, which must be assiduously worked till the soap has at least doubled its volume, when it must be put into the frames, cooled, and cut into pieces. Lathers well and is very pleasant. Any scent may be added.

FRANGIPANNI SOAP.—Curd soap (previously colored light brown), 7 lbs.; civet, $\frac{1}{4}$ oz.; otto of neroli, $\frac{1}{2}$ oz.; otto of santal, $1\frac{1}{2}$ oz.; otto of rose, $\frac{1}{4}$ oz.; otto of vitivert, $\frac{1}{2}$ oz. Rub the civet with the various ottos, mix, and beat in the usual manner.

FULLER'S EARTH SOAP.—Curd soap, 10 $\frac{1}{2}$

lbs.; marine soap, $3\frac{1}{2}$ lbs.; fuller's earth (baked), 14 lbs.; otto of French lavender, 2 oz.; otto of origanum, 1 oz.

GALL Soap.—Gall soap, for the washing of fine silken cloths and ribbons, is prepared in the following manner: In a vessel of copper one pound of cocoa-nut oil is heated to 60° Fahr., whereupon half a pound of caustic soda is added with constant stirring. In another vessel, half a pound of white Venetian turpentine is heated, and when quite hot, stirred into the copper kettle. This kettle is then covered and left for four hours, being gently heated, after which the fire is increased until the contents are perfectly clear, whereupon one pound of ox-gall is added. After this, enough good, perfectly dry castile soap is stirred into the mixture to cause the whole to yield but little under the pressure of the finger; for which purpose, from one to two pounds of soap are required for the above quantity. After cooling, the soap is cut into pieces. It is excellent, and will not injure the finest colors.

GREASE, To Preserve.—Boil all the scraps, rinds, and bones, in a weak lye, and the purer grease in clear water. Let the mixture cool, take off the cake of grease, and strain it. It is well to do this occasionally, as you save it; for when kept a long time, impure grease becomes offensive. You must be careful to dry off all the water before laying it away in your grease tub, if you wish it to keep sweet.

GREASE, To Purify.—If the grease is very foul in smell, it should be put in a boiler with water, on the fire (about three times as much water as of the grease), a small quantity (say a teaspoonful for five to ten pounds of grease) of permanganate of potash added, by stirring, to the whole, and after the mixture has cooled a little, it is strained through a cloth, and allowed to rest, when the cake of fat is taken out and put in a cool place, or in the pot in which it is to be remelted for transformation into soap. The purpose of the permanganate of potash is to remove the rank odor of the grease, which otherwise would contaminate the soap also.

HARD Soap.—Fused sulphate of soda has been used to harden soaps, which, made from inferior fats, would otherwise be too soft. This substance (Glauber salts, melted on a shovel or otherwise,) added to the soap in the proportion of 1 lb. of the salt to 20 lbs. of the soap, is said to remedy the defect, and to make a hard and sound soap out of what would otherwise be too soft for economical use.

HARD Soap.—Take 6 pounds of sal-soda, 6 pounds grease, and 3 pounds quick lime. Thoroughly mix the soda and lime in four gallons of water, pour off from the sediment, put in the grease and boil 20 minutes; pour off and before entirely cold cut in bars.

HARD Soap from Soft.—Take 7 lbs. good soft soap; 4 lbs. sal soda; 2 ounces borax; 1 ounce hartshorn; $\frac{1}{2}$ lb. rosin, to be dissolved in 22 quarts of water, and boiled about twenty minutes.

HARD Soap, with Lard.—Sal-soda and lard, of each 6 lbs.; stone lime 3 lbs.; soft water 4 gals.; dissolve the lime and soda in the water, by boiling, stirring, settling and pouring off; then return to the kettle (brass or copper) and add the lard and boil until it becomes soap; then pour into a dish or moulds, and when cold, cut it into bars and let it dry.

HONEY Soap.—Cut thin two pounds of yellow soap into a double saucepan, occasionally stirring it till it is melted, which will be in a few minutes if the water is kept boiling around it, then add a quarter of a pound of palm oil, quarter of a pound of honey, three pennyworth of true oil of cinnamon; let all boil together another six or eight minutes; pour out and stand it by till next day; it is then fit for immediate use. If made as these directions it will be found to be a very superior soap.

HONEY AND ALMOND PASTE.—Bitter almonds, blanched and ground, $\frac{1}{2}$ lb.; honey, 1 lb.; yolk of eggs, in number, 8; almond oil, 1 lb.; otto of bergamot, of cloves, each, $\frac{1}{4}$ oz. Rub the eggs and honey together first, then gradually add the oil, and finally the ground almonds and the perfume.

IODINE Soap.—From castile soap (sliced) 1 lb.; iodide of potassium, 1 oz.; dissolved in water, 3 fl. oz.; melt them together in a glass or porcelain vessel, over a water bath. Excellent in various skin diseases; also as a common soap for scrofulous subjects.

JUNIPER TAR Soap.—This soap is made from the tar of the wood of the Juniperus communis, by dissolving it in a fixed vegetable oil, such as almond or olive oil, or in fine tallow, and forming a soap by means of a weak soda lye, after the customary manner. This yields a moderately firm and clear soap, which may be readily used by application to parts affected with eruptions, at night, mixed with a little water, and carefully washed off the following morning. This soap has lately been much used for eruptive disorders, particularly on the continent, and with varying degrees of success. It is thought that the efficient element in its composition is a rather less impure hydrocarburet than that known in Paris under the name "huile de cade." On account of its ready miscibility with water, it possesses great advantage over the common tar ointment used for itch, etc.

LABOR-SAVING Soap.—Take 2 pounds of sal soda, 2 pounds of yellow bar soap, and 10 quarts of water. Cut the soap in thin slices, and boil together two hours; strain, and it will be fit for use. Put the clothes in soak the night before you wash, and to every pail of water in which you boil them, add a pound of soap. They will need no rubbing; merely rinse them out, and they will be perfectly clean and white.

LIQUID Soap.—Sweet oil, 7 parts; caustic potash, 1 part; rose water sufficient quantity to reduce it to a proper state. Rub the oil, alkali, and a few spoonfuls of the water together in a hot mortar until united, then add the remainder of the water as required.

LYE, To Make.—Have a large tub, or cask, and bore a hole in one side, for a tap, near the bottom; place several bricks near the hole, and cover them with straw. Fill the barrel with strong wood ashes. Oak ashes are strongest; and those of apple-tree wood make the whitest soap. Pour on boiling water until it begins to run, then put in the tap and let it soak. If the ashes settle down as they are wet, fill in until full.

LYE, White.—This is made by pouring a pailful of boiling water over 4 or 5 quarts of ashes. Let it stand a while to infuse; then pour in cold water to settle it, when you can pour it off clear. This is very good to be used on clothes

in. When made nice, is equal to soda, and does not, unless made extremely strong, injure the clothes.

MARBLED SOAP BALLS.—Take ten pounds of white oil soap and ten pounds of Joppa soap. Cut them into small square pieces, which set to dry for three days: the oil soap, particularly, must be thus dried. Scrape, very fine, five pounds of oil soap, which dry for one day in the open air; mix it well in the shaving box, with five pounds of powder, and add an ounce and a half of the best vermilion.

In mixing, place pieces of soap and colored powder in layers in the box; making in all four alternate layers of each. When a layer of each has been laid in the box, sprinkle a pint of rose water over the cut soap; for if it be much combined with the powder it will become lumpy and hard, and consequently spoil the wash balls. The same quantity of water is to be used for moistening each of the other soap layers. Next mix a pint of thin starch, which has been well boiled in half a pint of rain water, with half a pint of rose water, and distribute it, equally well mixed, among the mass, by turning it over repeatedly, and then press it down close with the hands. If a piece be now cut out from the mass the operator will perceive whether the marbling is sufficiently good: and if so, he may proceed immediately to form his wash balls.

MACQUER'S ACID Soap.—Castile soap, 4 ozs.; soften by heat and a little water; add oil of vitriol q. s., continually triturating the mass in a mortar. Detergent. Used where alkalis would be prejudicial.

MUSK Soap.—Good tallow soap, 30 pounds; palm soap, 26 pounds. Treat as for cinnamon soap, and perfume with the following mixture:—Powdered cloves, 5 ounces; powdered pale roses, 5 ounces; powdered gillyflower, 5 ounces; essence of bergamot, 4 ounces; essence of musk, 3¼ ounces. Color with brown ochre, 4¼ ounces.

ORANGE FLOWER Soap.—Palm soap, 2 parts; tallow soap, 3 parts. Mix, as for cinnamon soap, and perfume with the following essences: Essence of Portugal, 8 parts; essence of amber, 7 parts. Mix. Color with the following, as required: Red lead, 5 parts; yellow green, 33 parts. Mix.

PALM Soap (superior).—Cut thin two pounds of yellow soap into a double saucepan, occasionally stirring it till it is melted, which will be in a few minutes, if the water is kept boiling around it; then add quarter of a pound of palm oil, quarter of a pound of honey, and six cents worth of true oil of cinnamon; let all boil together another six or eight minutes; pour out, and stand it by till next day. It is then fit for immediate use.

PEARL SOFT Soap.—Take lard, 2 parts; potass lye (36° B.), 1 part. Put the lard over the fire; and, when half melted, stir it with a spatula until it assumes the appearance of milk, then add half the lye, stir well, but avoid increasing the temperature. When soapy granulations commence forming, and fall to the bottom, add the rest of the lye; continue the stirring until the paste is formed, then transfer the pan to a bath of warm water, and let them cool together. When cold, pound it in a marble mortar until it assumes a pearly appearance. Scent with bitter almonds essence.

PISTACHIO NUT MEAL.—Pistachio

nuts (decorticated as almonds are bleached), 1 lb.; orris powder, 1 lb.; otto of neroli, 1 drachm; otto of lemons, ½ oz.

Other meals, such as perfumed oatmeal, perfumed bran, etc., are occasionally in demand, and are prepared as the foregoing.

POTASH, Yield of.—As a general rule, the ashes of the following woods give:

100 lbs. of pine ashes yield 45-100 lb., or less than half a pound of potash.

100	"	poplar ashes	yield ¾ lb.
100	"	beech "	" 1.45 "
100	"	oak "	" 2.03 "
100	"	willow "	" 2.85 "
100	"	sug. maple "	" 3.9 "
100	"	elm "	" 3.9 "
100	"	wheat straw "	" 4.18 "
100	"	vine branches "	" 5.5 "
100	"	dry cornstalks "	" 17.5 "
100	"	potato stalks "	" 55. — "

One pound of caustic potash, on an average, combines with five pounds of clean grease, and will make five gallons of good soft soap.

ROSIN Soap.—Fifteen per cent. of rosin can be saponified with potash or soda lye, and mixed with clear, warm tallow soap to a good purpose; more would deteriorate it, although for the cheapest grade of soaps, thirty-three per cent. is often added; but such soaps remain soft and clammy, and are unsatisfactory to the consumer. Twelve gallons of strong lye (30° to 36° Beaume) are needed for 100 lbs. of rosin. Some soap-makers melt it with the fat in the commencement of the boiling of the soap, but experience has shown that it is best to prepare a pure tallow soap first, and afterward mix with it the rosin soap, made in a separate kettle. Both soaps in the hot state are to be thoroughly incorporated, by stirring and beating intimately for half an hour, and the whole passed through a wire sieve before transferring to the frames, and therein also well stirred with the crutch. Some palm oil, when saponified along with the tallow, will much improve the appearance of such a soap.

The rosin, previous to its being put in contact with the lye, should be ground fine, and while one workman is occupied in throwing it into the boiler containing the hot lye, another should be constantly occupied in stirring it in, as the mixture easily rises. The heat must not be too rapidly increased, nor is it necessary that it should boil all the time, but merely kept near the boiling point, but it is indispensable to keep stirring the mixture all the time, otherwise caking of the rosin will interfere with the progress of the operation. Saponification will be completed in about two hours, and then it may be added to the fat about being converted into soap, as above described.

SALT in Soap Making.—A very practical and a most useful adaptation of common salt (chloride of sodium) in partial substitution for alkali in the manufacture of soap, is now being most economically and advantageously used in this country. A soap can be produced in the bar, or molded into pattern, cheaper than by any other known process; and plain and fancy soaps of every odor, color, and design, are being freely circulated, at a figure costing the public no more, when boxed, than \$2.88 or \$3.36 per cwt. of 112 pounds. This, too, where the manufacturers have to pay 30 cents per cwt. for carriage on the salt.

SALT WATER Soap.—5 lbs. caustic soda, 7 gallons of water for the lye; 25 lbs. cocoa-nut oil or lard, as it is sometimes called; melt the oil, and introduce the lye gradually, and stir actively until creamy. A very small proportion of fused Glauber salts helps to make the soap harden.

SANTAL-WOOD Soap.—Curd soap, 7 lbs.; otto of santal, 7 oz.; otto of bergamot, 2 oz.

SAND Soap.—Curd soap, 7 lbs.; marine soap, 7 lbs.; sifted silver sand, 28 lbs.; otto of thyme, of cassia, of caraway, of French lavender, each, 2 ozs.

SAPONACEOUS CREAM of Almonds.—The preparation sold under this title is a potash soft soap of lard. It has a beautiful pearly appearance, and has met with extensive demand as a shaving soap. Being also used in the manufacture of Emulsines, it is an article of no inconsiderable consumption by the perfumer. It is made thus: Clarified lard, 7 lbs.; potash lye (containing 26 per cent. of caustic potash), 3¼ lbs.; rectified spirit, 3 ozs.; otto of almonds, 2 drachms. Melt the lard in a porcelain vessel by a salt water bath, or by a steam heat under 15 lbs. pressure; then run in the lye, very slowly, agitating the whole time; when about half the lye is in, the mixture begins to curdle; it will, however, become so firm that it cannot be stirred. The cream is then finished, but is not pearly; it will, however, assume that appearance by long trituration in a mortar, gradually adding the alcohol, in which has been dissolved the perfume.

SCENTING SOAPS COLD.—This method is exceedingly convenient and economical for scenting small batches, involving merely mechanical labor, the tools required being simply an ordinary carpenter's plane, and a good marble mortar, and lignum vite pestle. The woodwork of the plane must be fashioned at each end, so that when placed over the mortar it remains firm and not easily moved by the parallel pressure of the soap against its projecting blade. To commence operations, we take first 7 lbs., 14 lbs., or 21 lbs. of the bars of the soap that it is intended to perfume. The plane is now laid upside down across the top of the mortar. Things being thus arranged, the whole of the soap is to be pushed across the plane until it is all reduced into fine shavings.

Soap as generally received from the maker is the proper condition for thus working; but if it has been in stock any time it becomes too hard, and must have from one to three ounces of distilled water sprinkled in the shavings for every pound of soap employed, and must lay for at least twenty-four hours to be absorbed before the perfume is added to it.

When it is determined what size the cakes of soap are to be, what they are to sell for, and what it is intended they should cost, then the maker can measure out his perfume.

The soap being in a proper physical condition with regard to moisture, etc., is now to have the perfume well stirred into it. The pestle is then set to work for the process of incorporation. After a couple of hours the soap is generally expected to be free from streaks, and to be of one uniform consistency.

SHAVING Soap.—1. Good white soap (in thin shavings), 3 pounds; palm soap, 1 pound; soft water, ¾ pound; soda, 1 ounce. Melt carefully over a slow fire, in an earthen vessel, then

add oil of lavender, 60 drops; oil of lemon, 40 drops; bergamot, 50 drops. Mix well, and make it into forms.—2. Take 3 lbs. white bar soap, 1 lb. castile soap, 1 quart rain water, ½ pt. beef's gall, 1 gill spirits turpentine. Cut the soap into thin slices, and boil five minutes after the soap is dissolved, stir while boiling: scent with oil of rose or almonds. If wished to color it, use ½ oz. vermilion.

SHAVING PASTE.—1. Naples soap (genueine), 4 oz.; powdered castile soap, 2 oz.; honey, 1 oz.; essence of ambergris and oils of cassia and nutmegs, of each, 5 or 6 drops.—2. White wax, spermaceti and almond oil, of each, ¼ oz.; melt, and while warm, beat in 2 squares of Windsor soap previously reduced to a paste with a little rose-water.—3. White soft soap, 4 oz.; spermaceti and salad oil, of each, ½ oz.; melt them together, and stir until nearly cold. It may be scented at will. When properly prepared, these pastes produce a good lather with either hot or cold water, which does not dry on the face. The proper method of using them is to smear a minute quantity over the beard, and then to apply the wetted shaving brush, and not to pour water on them, as is the common practice.

SOAP-MAKING in General.—Animal fat, such as tallow, is the substance most at hand of all other fatty matters for soap-making, although vegetable oils, such as palm, cocoa-nut, castor, sunflower, olive and other oils, and also rosin, are used in soap-making occasionally, but tallow being more easily obtainable, and generally at a lower cost than most of the oils above enumerated, is most extensively employed in the manufacture of domestic soap. For purpose, after being freed of skin by boiling, straining and remelting, it is heated to the temperature of boiling water, and mixed on the fire with a hot solution of either soda, potash, or both, in water called the lye; the whole is gradually transferred into an iron pot, larger by at least one-third than the whole mixture, about one quart of the melted fat being first ladled into it, then as much or more of the hot lye, the mixture constantly stirred on the fire till a sort of creamy matter is formed, the ladling kept on alternately till all the lye and fat are mixed together; the stirring to be kept up on a moderate fire till the mixture boils, and is allowed to boil some ten or fifteen minutes, according to the strength of the lye employed; it is then transferred from the boiler into a form, a tight box, in which muslin has been placed overhanging the box, so that the soap may be afterward more easily drawn out of it for the purpose of drying it, or else it may be poured in a common wash-tub, previously soaked in water to prevent adhesion to the tub, and there allowed to harden for a few days, from whence it is transferred on boards, or upon a table, to dry and be cut in bars for use, by means of an annealed wire.

SOAP-MAKING, Country.—In most parts of this country it is as convenient, and much cheaper, to make soap from the lye of leached ashes than from a soda lye.

To leach the ashes properly for this purpose, from two to five per cent. of lime should be added, to give proper causticity to the potash in solution which the lye contains. The ordinary process is to have a receptacle made of boards and lined with straw, cone-shaped, the lye running through at the bottom. Upon the straw,

fresh wood ashes mixed with a little lime, is placed, and water poured thereon and allowed to filter through and trickle out from the point into a proper vessel. The lye will not be of uniform strength. Hot water poured upon the ashes makes a stronger lye than cold; in other words, it extracts more potash from the ashes. To get the lye to a uniform strength, and one proper for soap-making, boil it until a sound potato will float upon its surface. This is the farm wife's specific gravity test, and it is as accurate as any sold by the opticians. Then, into a kettle two-thirds full of lye, in with your melted fat, by ladlefuls at a time, and stir until it is creamy; now begin to add the salt by small handfuls, stirring carefully and rapidly until a ring made of the soapy matter on the stirring stick, remains visible. Then allow the fire to go out, and the soap to harden. It usually gathers on the top of the spent lye, from which it may be lifted when hard, or the lye can be poured off by tipping the kettle. Soft soap is made in the same way, without the salt.

A correspondent of a monthly magazine gives the following method of making soap for family use in the country: I start the lye to boiling, and then while boiling, if the lye is not strong enough to eat the feather off a quill, boil it down until it is. When it will just eat the feather, let the kettle be a little more than one-third full of lye, and put in grease, skins of the hogs, bacon rinds, meat fryings, and the like, until the kettle is about two-thirds full. The kettle must not be full, for with the least bit too much fire, over the soap goes. It is better to put in a little less than the necessary amount of grease. Lye and grease combine in certain proportions, but pass the limit, and no amount of boiling will take up an excess of grease. It will remain on top, hot or cold, and will be very troublesome; whereas a little too much lye will sink to the bottom when the soap comes. If the proportions are good, a little fire only is required to keep it boiling, and in a few hours it is done. Then take a bucket of weak lye, and let it boil up with the soap once. This will not disturb the already made soap, but will wash the dirt out that was in the grease, and with it settle to the bottom. When the soap is cold it can be cut out in cakes. Exposure to the air will soften it down until it is of about the consistency of mush, and a little darker, growing fairer and fairer. Some, instead of putting in lye to wash the dirt out of the soap, put in salt and water. The soap thus made is whiter, but is apt to be too stiff to use easily in the wash-tub. It makes excellent ball soap for washing dirty hands. I take some weaker lye and the clean part of that which is left in the bottom of the soap kettles, and enough to half fill one of the kettles or more, setting it in some convenient place outdoors. I put a stick of wood on the north side of the top of the kettle, lay on some boards, making a roof which is easily managed to shed rain, and lay another stick on top to keep the roof in place. By lifting one of the boards a little, I can put in from time to time whatever soap-fat is gathered in the family through the summer. Whenever the sun shines, I remove the cover and stir the lye. I facilitate the business a little in this way, and I have by fall a half kettle of decent soap, and no trouble with soap-fat in hot weather.

SOAP-MAKING by the Cold Way.—The fat

is melted at a low heat, not warmer than blood heat, and the lye gradually added—40 lbs. of strong lye (about 36° Beaumé) to 80 lbs. of fat, and less, even should the lye be stronger still. The lye should be perfectly clear, and not more than tepid in temperature. The fat and the lye should be persistently stirred with a broad wooden spatula, having sharp edges at its lower end, and rounded at its upper, for easy handling. The paddling should be kept up until a ring drawn with the spatula remains visible a short time. It is at that point that the coloring matters and perfumes are added, if any are wanted.

The parts should then be run into frames, previously lined with muslin so carefully that no folds be formed at the edges of the box. Each frame should be entirely filled with the soap, and well closed, with the margin of the muslin, and also fitted with a modern cover. The whole should be left for about one day to rest in a mild temperature, the complete change or saponification completing itself in the frames, where the temperature rises spontaneously to sometimes over 175° F. Under the influence of this action the various constituent principles in the mass, including the glycerine, become further combined, and a soap produced almost resembling that of boiled soaps. At the expiration of twenty-four hours the soap may be taken up from the frames, and cut up in bars to dry. Sometimes, especially when mutton tallow is mostly employed with soda for the lye, one-tenth of potash is added, to diminish the hardness of the soap; at the same time it increases its solubility and quality, the soap resulting from that addition not being brittle when dry, as it would be when exclusively made of hard tallow and soda lye. The yield of such soap is about 150 lbs. to 100 lbs. of fat.

SOAP (Home-made) from Caustic Soda.—It sometimes happens that caustic soda is not within reach, and yet sal-soda is to be had. To transform this material into a suitable lye for soap-making, this is a convenient and suitable process: Dissolve sal-soda, say three pounds, in two gallons of warm water. Slake in a firkin three pounds of good quicklime; add to it the soda solution; stir the whole thoroughly with a stick, and add two gallons of boiling water; stir again, and let it settle. Pour off the clear liquor in a clean iron boiler placed on the fire, and stir into it six pounds of clarified grease, and two ounces of powdered borax. Let it boil slowly till it gets thick and ropy (about ten minutes boiling), and pour it into a tub or tight box, as stated above. Soap thus made is an excellent hard soap for family use; after drying a month or so in a dry-room, and cut into bars, it is fit for use.

SOAP, Cheap.—Soap for family use can be made very cheap and of excellent quality with little trouble by the use of a common article sold in all drug stores. This is lye put up in a concentrated form in small iron boxes holding one pound. These boxes cost 25 cents in ordinary times, now we believe they retail at 40 or 50 cents, and will make 25 pounds of green or new soap. The plan of proceeding is merely to take a box of this substance, knock off the lid, and throw it into a gallon of boiling water. After standing ten hours, the lye will be clear, and must be thrown into a wash boiler with another

gallon of boiling water; when the contents of the vessel boil, four pounds of any grease must be added slowly, poured in a thin stream and stirred well. When intimately mixed, the boiler should simmer slowly for four or six hours, and half an hour before taking off, another gallon of hot water may be added, together with half a teacupful of salt. The latter is not necessary, however, and if too much is thrown in, the soap is curdled or made short so that it breaks and wastes. When the soap is thought to be done, plunge a case knife in; if the mass drops clear and ropy and chills quickly, it is soap and will be firm and hard when cold. Have ready a wash tub well wet on the bottom and sides; pour the soap in and let it set; in a few hours it will be hard enough to cut out and as white as snow. This process makes twenty-five pounds of soap; or, by the aid of grease, four pounds, lye, one pound, twenty-four pounds of water, less two quarts driven off in boiling, (one gallon weighs eight pounds nearly,) are converted into soap of excellent detersive properties. Since the grease is saved from the family waste, the soap has only cost what the lye has come to, and as the loss by drying is only 25 per cent., eighteen pounds of soap can be made for fifty cents, or a little less than three cents per pound.

SOAP AU BOUQUET.—Good tallow soap (in shavings), $\frac{1}{4}$ cwt.; essence of bergamot, 4 ounces; oil of cloves, 7 drachms; oil of sassafras, 7 drachms; oil of thyme, 7 drachms; neroli, $3\frac{1}{2}$ drachms; brown ochre to color. Reduce the soap to a perfectly even paste by the heat of a water-bath, adding a little water, then proceed, as for Soap à la Rose.

SOAP A LA ROSE.—New olive oil soap 30 lbs.; new tallow soap 20 lbs.; reduce them to shavings by sliding the bars along the face of an inverted plane, melt in an untinned copper pan by the heat of steam or a water-bath, add $1\frac{1}{2}$ oz. of finely-ground vermilion, mix well, remove the heat, and when the mass has cooled a little, add essence of roses (otto?) 3 oz.; do. of cloves and cinnamon, of each 1 oz.; bergamot $2\frac{1}{2}$ oz.; mix well, run the liquid mass through a tammy cloth, and put it into the frames. If the soaps employed are not new, 1 or 2 quarts of water must be added to make them melt easily. Very fine.

SOAP from Yolk of Egg.—M. Manny, a pharmacien, of Valence, in Dauphiny, has introduced into commerce, with considerable success, a soap made from yolk of egg, which is spoken highly of, its price being the only objection to its general use. This soap is of a yellow color and firm consistence, having an odor by no means disagreeable. It dissolves readily in any water, and cleans as well as the best Marseilles soap.

SPERMACETI Soap.—Curd soap, 14 lbs.; otto of bergamot, $2\frac{1}{2}$ lbs.; otto of lemon, $\frac{1}{2}$ lb.

STARKEY'S Soap.—Spirits of turpentine, caustic potash, and water, of each a sufficient quantity. The potash may be rendered caustic by passing the lye over quicklime.

SULPHURETED Soap.—From white soap, 2 oz.; sublimed sulphur, $\frac{1}{4}$ oz.; beaten to a smooth paste in a marble mortar with 1 or 2 fl. dr. of rectified spirit strongly colored with alkanet root, and holding in solution otto of roses, 10 or 12 drops. In itch and various other cutaneous diseases.

SOFT Soap.—1. Take 1 gallon of soft soap, to which add 1 gill of common salt, and boil an hour. When cold, separate the lye from the crude. Add to the crude 2 pounds of sal soda, and boil in 2 gallons soft water till dissolved. If you wish it better, slice 2 pounds of common bar soap, and dissolve in the above. If the soft soap makes more than 3 pounds of crude, add in proportion to the sal soda and water.—2. For one barrel take potash, eight pounds; melted and clarified fat, eight pounds. Crack the potash in small lumps, and put it into a large iron pot of three or four gallons capacity, with hot boiling water to nearly fill it. Heat the fat in another iron pot quite hot. Put three or four gallons of hot water in the barrel, previously cleaned and ready for use, and ladle in it alternately the hot fat and hot lye; stir the whole briskly for a while before more lye and fat are ladled in, and gradually add enough hot water to fill the barrel; stir again the whole, after each ladle of hot water, till the whole becomes a creamy mass, uniform in its appearance. Allow it to rest for three months in a temperate place or cellar.—3. Dissolve a quarter of a pound of lime in a gallon of cold water, then take off the clear; dissolve half a pound of sal-soda in a quart of water, and mix it with the clear lime-water; one pound of brown soap, dissolved in a gallon of water, is then to be added to the clear liquor formed with the sal-soda and lime-water, and this forms the soap. This soft soap is excellent for boiling, white linens. It removes all grease that is in them, because it contains an excess of caustic lye. About one quart of it is sufficient for boiling clothes in a ten gallon copper. A quantity of this may be made up and kept for constant use.

TALLOW, To Clarify.—Dissolve one pound of alum in one quart of water, add this to 100 pounds of tallow in a jacket kettle (a kettle set in a larger one, and the intervening space filled with water. This prevents burning the tallow.) Boil three quarters of an hour and skim. Then add one pound of salt dissolved in a quart of water. Boil and skim. When well clarified the tallow should be nearly the color of water.

TALLOW, To Harden.—I have used the following mixture with success: To one pound tallow take one fourth of a pound common rosin; melt them together, and mold the candles the usual way. This will give a candle of superior lighting power, and as hard as a wax candle; a vast improvement upon the common tallow candle, in all respects except color.

TEST for Soap.—The value of boiled soaps of course depends greatly on the quality of the materials used. This accounts for the difference in price and quality. The purest materials, such as clean tallow or pure oils, thoroughly saponified, yield the most valuable soaps, costing more per pound, but they are cheaper in the end. A good soap is a perfectly neutral compound, and will in no case injure the most delicate fabrics. The simplest method of testing soap is by tasting. If it is sharp and biting on the tongue, there is an excess of alkali; but if it leaves no unpleasant sensation on the tongue, there is not the least danger that it will rot or otherwise injure clothes in washing.

TONQUIN MUSK Soap.—Pale brown colored curd soap, 5 lbs.; grain musk, $\frac{1}{4}$ oz.; otto of bergamot, 1 oz. Rub the musk with the

bergamot, then add it to the soap, and beat up.

TRANSPARENT Soaps.—Are usually prepared from good tallow and rosin soap thoroughly dried and cut into thin shavings. These are stirred in strong alcohol (sp. gr., 849.), heated in a still to the boiling point in a water-bath or steam jacket arrangement; a stirring rod being connected with the still the soap is promptly dissolved, and the alcohol condensed in a worm and recipient for future operations, while the soap is discharged from its boiler through a pipe and faucet at the bottom into a kettle, where it is rapidly perfumed with essential oils, and from there into molds of any given form for purposes of sale. Three and a half to four gallons of alcohol are usually employed for dissolving 50 lbs. of soap in shavings.

TRANSPARENT Soap.—Slice 6 lbs. nice yellow bar soap into shavings; put into a brass, tin, or copper kettle, with alcohol, $\frac{1}{2}$ gallon, heating gradually over a slow fire, stirring till all is dissolved; then add 1 oz. sassafras essence, and stir until all is mixed; now pour into pans about $1\frac{1}{2}$ inches deep, and when cold cut into square bars the length or width of the pan, as desired.

TRANSPARENT SOFT Soap.—Solution caustic potash (Lond. Ph.), 6 lbs.; olive oil, 1 lb. Perfume to taste.

Before commencing to make the soap, reduce the potash lye to one half its bulk by continued boiling. Now proceed as for the manufacture of saponaceous cream. After standing a few days, pour off the waste liquor.

WASH BALLS, Cream.—White curd soap, 7 pounds; powdered starch, 1 pound; water or rose water sufficient to mix. Beat the whole together, and form into balls.

WASH BALLS, Lemon.—Cut 6 pounds of soap into very small pieces; melt it with a pint of water in which 6 lemons have been boiled. When melted, withdraw the soap from the fire, and add 3 pounds of powdered starch, and a little essence of lemon. Knead the whole into a paste, and form into balls of the desired size.

WASHING FLUIDS.—This preparation answers very well for family washing, and saves soap considerably, which last is needful merely upon the most soiled portions, such as wristbands, collars, etc. Sal-soda, three pounds; best unslaked lime, three quarters of a pound; hot water, four gallons. Slake the lime in sufficient boiling water; add to it the sal-soda, previously dissolved in the four gallons of hot water; stir the whole thoroughly, and allow it to rest and settle; pour off the clear liquid; bottle in clean bottles, and cork tight for use. To two pails of water add one pint of washing fluid, and boil the clothes in it (it is better to boil the water before adding the fluid.)

This preparation in the proportions given, does not injure the linen, and diminishes the amount of soap and rubbing considerably. Another excellent one is as follows:

Take two pounds of the best brown soap; cut it up and put it in a clean pot, adding one quart of clean soft water. Set over the fire, and melt thoroughly, stirring it up from the bottom occasionally. Then take from the fire, and stir in one tablespoonful real white wine vinegar; two large tablespoonfuls of hartshorn, and seven large tablespoonfuls of spirit of turpentine. Hav-

ing stirred the ingredients well together, put the mixture immediately into a stone jar; cover without delay, lest the hartshorn evaporate. Keep it always closely covered. When going to wash, nearly fill a six or eight gallon tub with soft water, as hot as you can bear your hand in, and stir in two large tablespoonfuls of the mixture. Put in as many white clothes as the water will cover; let them soak about an hour, moving them about in the water occasionally. It will only be necessary to rub with the hands such parts as are badly soiled; the ordinary dirt will soak out. Wring out and rinse well through two cold waters.

Next put into the wash kettle sufficient water to boil the clothes (it must be cold at first), and add to it two tablespoonfuls of the washing mixture. Put in the clothes after the mixture is well stirred, and boil them half an hour, not more. Then take out and throw into a tub of cold water; rinse well in this, and lastly put into a second tub of rinsing water, slightly blued with the indigo bag. The double rinsing is important, and by following the above directions the washing mixture will save much time and labor, and render the clothes beautifully white, without injury.

WHALE-OIL Soap.—For the destruction of insects: Render common lye caustic, by boiling it at full strength on quicklime; then take the lye and boil it with as much whale oil foot as it will saponify (change to soap), pour off into molds, and, when cold, it is tolerably hard. Whale oil foot is the sediment produced in refining whale oil.

WHITE HARD Soap.—To 15 pounds of lard, or suet, made boiling hot, add slowly 6 gallons of hot lye, or solution of potash, that will bear up an egg high enough to leave a piece big as a shilling, bare. Take out a little, and cool it. If no grease rise, it is done. If any grease appears, add lye, and boil till no grease rises. Add 3 quarts of fine salt, and boil up again. If this does not harden well on cooling, add more salt. If it is to be perfumed, melt it next day, add the perfume and run it in moulds, or cut in cakes.

WINDSOR Soap.—1. Hard soap, 7 pounds; water to soften, then add oil of caraway, 2 drachms; finely powdered cassia, 3 ounces. Form into cakes.—2. Hard white soap, 7 pounds; oil of caraway, 3 drachms; essence of bergamot, 6 drachms. Reduce to a paste with water, and mould.—3. White hard soap, 1 cwt; potato starch, 56 pounds; pipe clay, 16 pounds; pearl-ash, 4 pounds; oil of cassia and oil of lavender, each 8 ounces; oil of caraway and oil of origanum, each 6 ounces; oil of cloves, 1 ounce; bergamot, 7 ounces. Mix.—4. White soap, 14 pounds; oil of caraway, 3 ounces; essence of musk, 1 ounce; oil of origanum, $\frac{1}{2}$ ounce; oil of lavender and essence of bergamot, each $\frac{1}{4}$ ounce; finely powdered cassia, 8 ounces. Reduce with water, and form into cakes.—5. White hard soap, 56 pounds; white pipe clay, 50 pounds; white pearl-ash, 6 pounds. Reduce them to a paste with water, then add oil of cassia and oil of caraway, each 8 ounces; oil of lavender, 6 ounces; oil of cloves, 1 ounce; essence of lemon and essence of bergamot, each 5 ounces. Mix, and form into cakes as before.—6. Brown. Brown pearl-ash soap and white hard soap, each $\frac{1}{2}$ cwt.; pearl-ash or soda and yellow ochre, each

7 pounds; powdered cassia, 3 pounds; powdered cloves, 1 pound; oil of caraway and oil of lavender, each 8 ounces; essence of bergamot and essence of lemon, each 12 ounces. Mix.—7. (*Brown.*) Good brown pearlash soap, fuller's earth, and white hard soap, each $\frac{1}{4}$ cwt.; soda and ochre, each 8 pounds; powdered cassia, 5 pounds; powdered cloves, $\frac{1}{2}$ pound; oil of caraway, 8 ounces. Mix.—8. (*Brown.*) Good brown soap, 2 cwt.; white hard soap and fuller's earth, each 1 cwt.; yellow ochre, $\frac{1}{4}$ cwt.; pearlash, 25

pounds; oil of caraway and oil of rosemary, each 1 pound; oil of lavender, 2 pounds; essence of bergamot, 3 pounds; finely powdered cassia, 18 pounds; finely powdered cloves, $\frac{1}{2}$ pound. Mix.—9. (*Very fine.*) Beef suet, 9 parts; olive oil, 1 part. Saponify with caustic soda lye, then collect the paste, and add one per cent. of the following perfume: Oil of caraway, 16 parts; oil of rosemary and oil of lavender, each 5 parts. Mix well, and mould.

TOILET.

BALDNESS, Treatment for.—A loosening of the hair frequently occurs in young persons, as well as those of the middle period of life; this, if neglected, becomes real baldness. But, if proper treatment be pursued, the hair will grow afresh, and assume all its pristine strength. A useful practice in men, and those of the opposite sex whose hair is short, is to immerse the head in cold water morning and night; dry the hair thoroughly, and then brush the scalp until a warm glow is produced. In women with long hair this plan is objectionable, and a better one is to brush the scalp until redness and a warm glow are produced, then dab among the roots of the hair the following lotion: Vinegar of cantharides, $\frac{1}{2}$ ounce; eau de Cologne, 1 ounce; rose water, 1 ounce. Mix. If the lotion produce smarting, or tenderness, the brush may be laid aside; but if no sensation is occasioned, the brushing should be resumed, and a second application of the lotion be made. This treatment should be practiced once or twice a day, or at intervals of a few days, according to the state of the scalp; namely, if tender, less; if insensible, more frequently. When the baldness happens in patches, the skin should be well brushed with a soft tooth brush, dipped in distilled vinegar, morning and evening, or dipped in the lotion above mentioned. If the lotion should have the effect of making the hair harsh and dry, this inconvenience may be removed by the use of oil or pomatum after each application of the lotion.

BALDNESS, Coal Oil for.—A resident of Carrollton, Miss., has discovered that petroleum will make the hair grow. The way that he found out this new property of coal oil was simply this: He had a large boil on the bald place on his head, which gave him much pain, and in the absence of anything else he rubbed coal oil on it. He says it relieved the pain almost instantly, so he continued to rub on the oil until the boil was entirely well, when, to his surprise, he found a thin coating of hair coming out over the bald place. He continued the use of the oil for a month or two, and now has a heavy coat of hair on his head.

BALDNESS, Erasmus Wilson's Lotion for.—Eau de Cologne, 2 ounces; tincture of cantharides, 2 drachms; oil of lavender or rosemary, of each ten drops. These applications must be used once or twice a day for a considerable time; but if the scalp become sore, they must be discontinued for a time, or used at longer intervals.

BALDNESS, Pomade against.—Macerate a drachm of powdered cantharides in one ounce of spirits of wine. Shake it well during a fortnight, and then filter. Take ten parts of this tincture, and rub it with ninety parts of cold lard. Add a little essence of bergamot, or any other scent. Rub this pomade well into the head, night and morning. In ninety-nine cases out of a hundred, this application, if continued, will restore the hair. Another receipt: Take of extract of yellow Peruvian bark, 14 grains; extract of rhatany root, 8 grains; extract of burdock root, and oil of nutmegs (fixed), of each 2 drachms; camphor (dissolved with spirits of wine), 15 grains; beef marrow, 2 ounces; best olive oil, 1 ounce; citron juice, $\frac{1}{2}$ a drachm; aromatic essential oil, as much as sufficient to render it fragrant; mix, and make into an ointment. Two drachms of bergamot, and a few drops of otto of roses would suffice. This is considered a valuable preparation for the hair, and is to be used as the above.

BALDNESS, other Remedies for.—1. Take water, 1 pint; pearlash, $\frac{1}{2}$ ounce; onion juice, 1 gill. Mix, and cork in a bottle. Rub the head hard with a rough linen towel dipped in the mixture.—2. Take water one pint, pearlash, one-half ounce, onion juice one gill, mix and cork in a bottle. Rub the head night and morning with a rough towel dipped in the mixture.—3. Salad oil 1 oz.; oil of origanum 12 drops; oil of rosemary 10 drops; oil of lavender 6 drops; oil of cloves 2 drops; mix and shake well together.—4. Beef suet 1 oz.; tincture of cantharides 1 teaspoonful; oil of origanum and bergamot, of each 10 drops. *Proc.* Melt the suet, and when nearly cold, add the rest and stir until set.—5. The decoction of boxwood, successful in cases of baldness, is thus made:—Take of the common box, which grows in garden borders, stems and leaves four large handfuls; boil in three pints of water, in a closely covered vessel, for a quarter of an hour, and let it stand in a covered earthenware jar for ten hours or more; strain, and add an ounce and a half of Eau de Cologne, or lavender water, to make it keep. The head should be well washed with this solution every morning.

BEAUTIFUL, How to be.—Beauty has its foundations in physical well being. Health has its laws, which must be understood and obeyed; and these laws are clearly indicated in our physical and mental constitutions. They demand:

1. Proper food and drink in such quantities as the system is capable of readily assimilating.
2. Air and sunlight in abundance.
3. Sufficient exercise, rest and sleep.
4. An agreeable temperature.
5. Perfect cleanliness.

The whole secret of a full form and rosy cheeks lies in pure blood, manufactured from wholesome food, by healthy and active vital organs, oxygenated and vitalized in well expanded lungs, and kissed by the life giving sunlight on the surface of the warm cheek. She who will have the color she covets on any other terms must buy it of the apothecary, and renew it every time she makes her toilet.

BLOTCHED FACE, Wash for.—Rose-water, three ounces; sulphate of zinc, one drachm. Mix. Wet the face with it, gently dry it, and then touch it over with cold cream, which also dry gently off.

BREATH, Offensive.—From six or ten drops of the concentrated solution of chloride of soda, in a wine glassful of pure spring water, taken immediately after the ablutions of the morning are completed, will instantly sweeten the breath by disinfecting the stomach, which far from being injured, will be benefited by the medicine. If necessary, this may be repeated in the middle of the day. In some cases the odor arising from carious teeth is combined with that of the stomach. If the mouth is well rinsed with a teaspoonful of the solution of the chloride in a tumbler of water, the bad odor of the teeth will be removed.

COLD CREAM.—Take white wax 1 oz., spermaceti 1 oz., oil of almonds $\frac{1}{4}$ pint. Melt, pour the mixture into a Wedgewood mortar which has been heated by being immersed in hot water; add gradually rose water, 4 fl. ounces, and stir until an emulsion is formed, and afterward until the whole is nearly cold. Put in pots. It may be perfumed with bergamot or lavender.

COLD CREAM, Home made.—Procure perfectly fresh lard, which has never been touched by salt; wash it thoroughly in spring water, freshly drawn, and do this in three different waters; then leave it to soak in fresh water, and in a cool shade for twenty-four hours. Then wash it once more, and beat until it becomes a cream, in as much rose-water of the stronger sort as it will absorb, during the process of beating. When finished, the rose-water will have penetrated every part, and should also stand in little pools here and there on the soft and porous-like surface.

COMPLEXION, To Preserve.—Plenty of out-door exercise, a well-regulated appetite, and a cheerful mind are the best defence against the "green and yellow" hue, which gradually creeps over the roses on the cheeks of so many of our country women.

COMPLEXION, To Improve.—Take a quarter of a pound of Castile soap, slice it down into a pewter jar, and pour upon it two quarts of alcohol; place the jar in a vessel of water at such a heat as will cause the spirits to boil, when the soap will soon dissolve; then put the jar, closely covered, in a warm place until the liquor is clarified; take off any scum that may appear on the surface, and pour it carefully from the dregs, then put it into a jar again, and place it in a vessel of hot water, distilling all the spirits that may rise; dry the remaining mass in the air for a

few days, when a white transparent soap will be obtained, free from all alkaline impurities, and perfectly void of smell. It is much used for softening and beautifying the skin.

COMPLEXION, Wash for.—Take two gallons of strong soap-suds, add to this one pint of pure alcohol, and a quarter of an ounce of rosemary. Mix these well together, and they are fit for application. It should be applied with a linen rag.

Another article, applied in the same way, and easily obtained, is horse-radish, grated into sweet milk; which will be fit for use in about seven or eight hours.

COMPLEXION and COLORS.—The pink of the complexion is brought out by a green setting in dress or bonnet; and any lady who has a fair complexion, that admits of having its rose-tint a little heightened, may make effective use of the green color; but it should be a delicate green, since it is of importance to preserve harmony of tone. When there is in the face a tint of orange, mixed with brown, a brick-red hue will result from the use of green; if any green at all be used in such a case it should be dark. But for the orange complexion of a brunette, there is no color superior to yellow. This imparts violet to a fair skin, and injures its effect. A skin more yellow than orange has its yellow neutralized by the suggestion of the complement, and a dull white effect imparted. The orange skin, however, has its yellow neutralized, and the red left, so that the freshness of complexion is increased in darkhaired beauties. Blue imparts orange, which enriches white complexions and light fresh tints; it also, of course, improves the yellow hair of blondes. Blue, therefore, is the standard color for a blonde, or yellow for a brunette. But the brunette who has already too much orange in her face, must avoid setting it in blue. Orange suits nobody. It whitens a brunette, but that is scarcely a desirable effect, and it is ugly. Red, unless when it is of a dark hue, to increase the effect of whiteness by contrast of tone, is rarely suitable in any close neighborhood to a lady's skin. Rose red destroys the freshness of a good complexion; it suggests green.

CORNS.—A horny induration of the skin, with a central nucleus, very sensitive at the base. The common cause of corns is continued pressure over the projection of the bones, from tight or stiff boots and shoes. They are of two kinds, hard and soft. The first grow on the exposed portions of the joints: the last, between the toes. Prevention.—This consists in keeping the feet clean, by frequent ablution in warm water, and in the use of easy, soft, boots and shoes. Without the latter precaution, corns will return even after they appear to have been perfectly removed. Treatment.—After soaking the feet in warm water for a few minutes, pare the corns as close as possible with a sharp knife, taking care not to make them bleed. They may now be touched over with a little lunar caustic, or nitric acid, or a little concentrated acetic acid or aromatic vinegar. The last two do not stain the skin. The first is used by merely rubbing it on the corns, previously moistened with water; the others, by moistening the corns with them by means of a small strip of wood, or, preferably a rod of glass; due care being taken not to allow the liquid to touch the neighboring parts. This treatment

adopted every three or four days for ten days or a fortnight, accompanied by the use of soft, loose shoes, will generally effect a cure. It has been recommended to remove large corns by ligatures of silk applied as close to their base as possible, and tightened daily until they fall off; but this plan is tedious and often inconvenient, and is not always successful. Another mode of extirpation is the application of a small blister, which will frequently raise them with the skin out of their beds. In this case the exposed surface must be dressed with a little simple ointment. Soft corns may be removed by applying ivy leaf, previously soaked in strong vinegar, changing the piece every morning; or by placing a dressing of soap cerate, spread on a bit of lint or old rag between the toes. One of the simplest and best remedies for hard corns, and which has received the sanction of high medical authority, is to wear upon the toe or part affected a small circular piece of soft leather, or still better, a piece of amadou spread with diachylon or some emollient plaster, and having a hole cut in the center corresponding to the size of the corn. By this means the pressure of the boot or shoe is equalized, and the apex of the corn protected from injury. The following are among the most useful of the popular remedies for corns:

CORNS, Caustic for.—Tincture of iodine and chloride of antimony, of each one drachm; iodide of iron, three grains; mix. It is applied with a camel hair brush after paring the corn. Two to four applications are said to effect a cure.

CORNS, Lotion for.—1. A solution of sal ammoniac, one part; in proof spirit, four parts. 2. A concentrated aqueous solution of sulphate of copper. To be applied night and morning.

CORN PLASTERS.—1. From white diachylon, three parts; yellow resin, two parts; verdigris, one part; melted together and laid on leather.—2. From galbanum plaster, one ounce; verdigris, one drachm; as the last.—3. From resin plaster, two ounces; black pitch, one ounce; verdigris and sal ammoniac, of each, half drachm.—4. To the last add powdered opium, one drachm. Recommended to allay pain, etc.—5. A piece of spread adhesive plaster is placed upon a table, and a piece of card paper having a round hole cut in it the size of the central portion of the corn is laid upon it; the exposed part is then softened by holding a piece of heated iron for a second or two near it; the card paper is then instantly removed and nitrate of silver in fine powder is sprinkled over the part which has been warmed. As soon as the whole is cold the loose powder is shaken off and the plaster is ready for use. Very cleanly and convenient. Two or three applications seldom fail to effect a cure.

CORN PLASTER, (Mechanical).—From common adhesive plaster spread on buckskin, amadou or vulcanized India rubber cut into pieces and a circular hole corresponding to the size of the corn punched in it.

CORN, Pomade for.—1. Powdered verdigris, one drachm; savin ointment, seven drachms.—2. Dried carbonate of soda, three drachms; lard, five drachms; verdigris or smalts, enough to give a slight tinge of green or blue. Applied on a piece of rag.

CORN SOLVENT.—1. Carbonate of potassa or pearlash, contained in an open jar or bottle, set in a damp place until it deliquesces into an

oil-like liquid (oil of tartar). Applied by means of a feather, or a small piece of rag dipped in it is bound on the corn.—2. Hydrate of potassa, one dram; rectified spirit, one ounce; dissolve. As No. 1.—3. Carbonate of potassa, with smalts, ochre or bole, enough to give it the required color. It must be kept dry in a well corked bottle. A pinch is then placed on the corn and confined by means of adhesive plaster or rag.—

4. Carbonate of soda, one ounce, finely powdered and mixed with lard, half ounce. Applied on linen rag every night.—5. Carbonate of potassa, two parts; salt of sorrel, one part; each in fine powder; mix and place a small quantity on the corn for four or five successive nights, binding it on with a rag. Care must be taken in all cases to pare the corn moderately close before applying the remedy; but in no case should any of the above be applied to a raw surface.

CURLS (False), Pomade for.—Melt together, in an earthen pipkin, 24 ounces of Burgundy pitch and 8 ounces of white wax; add 1 ounce of pomatum; remove from the fire, and add 4 ounces of brandy or other spirit; replace it on the fire till it boils slightly, then strain through linen, adding bergamot or other perfume, and cast in molds.

DANDRUFF.—Dandruff may be caused by wearing close and heavy hats or caps, by the application of oils or dyes to the hair, by confining the hair too closely to the head, by excessive brain-labor, by uncleanness, or by all these causes combined. To effect a cure, wear the hair short, let the head-covering be as light and well ventilated as possible, avoid all applications of grease or dyes, exercise the brain less and the body more, and wash the head thoroughly two or three times a day in cold water, and follow each washing by a vigorous rubbing with the balls of the fingers. The better the general health is and the stronger the digestion, the less tendency there will be to this disease, as well as to all others.

DANDRUFF, other Remedies for.—1. Take carbolic acid $\frac{1}{2}$ drachm; oil of bergamot 1 drachm; glycerine 2 oz. Mix; rub thoroughly into the roots of the hair, and apply bay rum freely afterwards; one application will cleanse the hair and scalp as clean as can be desired. Its use once a week will keep the hair soft and glossy, and will prevent dandruff from forming, besides keeping the scalp healthy and cool.—2. Take a thimbleful of powdered refined borax, let it dissolve in a teacupful of water, first brush the head well, then wet a brush and apply it to the head. Do this every day for a week, and twice a week for a few times, and you will effectually remove the dandruff.

ERUPTIONS on the Face.—Dissolve an ounce of borax in a quart of water, and apply this with a fine sponge every evening before going to bed. This will smooth the skin when the eruptions do not proceed from an insect working under the cuticle. Many persons' faces are disfigured by red eruptions caused by a small creature working under the skin. A very excellent remedy is to take the flour of sulphur and rub it on the face dry, after washing it in the morning. Rub it well with the fingers, and then wipe it off with a dry towel. There are many who are not a little ashamed of their faces who can be cured if they follow these directions.

EYELASHES, To Lengthen.—The mode

adopted by the beauties of the East to increase the length and strength of their eyelashes is simply to clip the split ends with a pair of scissors about once a month. Mothers perform the operation on their children, both male and female, when they are mere infants, watching the opportunity whilst they sleep; the practice never fails to produce the desired effect.

EYELASHES, To Blacken.—The simplest preparations for this purpose, are the juice of elder-berries, burnt cork, and cloves burnt at the candle. Another means is, to take the black of frankincense, rosin, and mastic. This black will not come off with perspiration.

A stick of India ink is the best of all.

FLESH WORMS.—These specks, when they exist in any number, are a cause of much unsightliness. They are minute corks, if we may use the term, of coagulated lymph, which close the orifices of some of the pores or exhalant vessels of the skin. On the skin immediately adjacent to them being pressed with the finger nails, these bits of coagulated lymph will come from it in a vermicular form. They are vulgarly called "flesh worms," many persons fancying them to be living creatures. These may be got rid of and prevented from returning, by washing with tepid water, by proper friction with a towel, and by the application of a little cold cream. The longer these little piles are permitted to remain in the skin the more firmly they become fixed; and after a time, when they lose their moisture they are converted into long bony spines as dense as bristles, and having much of that character. They are known by the name of spotted achne. With regard to local treatment, the following lotions are calculated to be serviceable:—1. Distilled rose-water, 1 pint; sulphate of zinc, 20 to 60 grains. Mix.—2. Sulphate of copper, 20 grains; rose-water, 4 ounces; water 12 ounces. Mix.—3. Oil of sweet almonds, 1 ounce; fluid potash, 1 drachm. Shake well together, and then add rose-water, 1 ounce; pure water, 6 ounces. Mix. The mode of using these remedies is to rub the pimples for some minutes with a rough towel, and then dab them with the lotion.—4. Wash the face twice a day with warm water, and rub dry with a coarse towel. Then with a soft towel rub in a lotion made of two ounces of white brandy, one ounce of cologne, and one half ounce of liquor potassa.

FRECKLES, Removal of.—Freckles, so persistently regular in their annual return, have annoyed the fair sex from time immemorial; and various means have been devised to eradicate them, although thus far with no decidedly satisfactory results. The innumerable remedies in use for the removal of these vexatious intruders are either simple and harmless washes, such as parsley or horse-radish water, solutions of borax, etc., or injurious nostrums, consisting principally of lead and mercury salts.

If the exact cause of freckles were known, a remedy for them might be found. A chemist in Moravia, observing the bleaching effect of mercurial preparations, inferred that the growth of a local parasitical fungus was the cause of the discoloration of the skin, which extended and ripened its spores in the warmer season. Knowing that sulpho-carbolate of zinc is a deadly enemy to all parasitic vegetation (itself not being otherwise injurious), he applied this salt for the purpose of removing the freckles. The compound

consists of two parts of sulpho-carbolate of zinc, twenty-five parts of distilled glycerine, twenty-five parts of rose-water, and five parts of scented alcohol, and is to be applied twice daily for from half an hour to an hour, then washed off with cold water. Protection against the sun by veiling and other means is recommended, and in addition, for persons of pale complexion, some mild preparation of iron.

FRECKLES, Other Cures for.—1. A very simple and harmless remedy is equal parts of pure glycerine and rose water, applied every night, and allowed to dry. The following lotion is harmless:—one drachm of sal-ammoniac, dissolved in a pint of spring water, add a quarter of an ounce of eau de Cologne; apply it night and morning.—2. Take tincture of benzoin, 1 pint; tincture of tolu, $\frac{1}{2}$ pint; oil of rosemary $\frac{1}{4}$ ounce. Mix. One tea-spoonful of the tincture to be put in half a gill of water, and with a towel dipped in this rub well the face, night and morning.—3. Take an ounce of lemon juice, a quarter of a drachm of powdered borax and a drachm of sugar. Mix them and let them stand till fit for use. Then rub it on the freckles occasionally. Or else take half a drachm of muriate of ammonia, two drachms of lavender water. Apply this with a sponge two or three times a day.—4. Wash the skin frequently with a liniment composed of equal parts of sweet oil, lime-water, and ammonia. Distilled elder-flower water is also an excellent application for removing freckles. The skin should be bathed with it for five or ten minutes, and washed afterward with clear water night and morning. The honeywash, which is simply honey dissolved in lukewarm water, and used when cold, is another good lotion for freckles.—5. (*Balsam of Honey.*) Take fine pale honey 4 ounces; glycerine 1 ounce. Mix by a gentle heat; when cold add alcohol 1 ounce; essence of ambergris 6 drops; citric acid 3 drachms. This is intended to remove discolorations and freckles, as well as to improve the general appearance of the skin.—6. Finally, lemon juice alone is probably as good as anything. And now, after all, if it were our case, we should let cosmetics alone—unless abundant exercise, fresh air, soap and water, and plain living might be considered cosmetics.

GUMS, Wash for, (Eau de Boto).—Take anise-seed, 80 parts; cloves, 20 parts; cinnamon, 20 parts; oil of peppermint, 10 parts; cochineal, 5 parts; vanilla, 1 part; rectified spirits, 800 parts; rose water, 200 parts. Digest for about a week and filter; then add of essence of amber, 1 part. A few drops in a glass of water to rinse the mouth with.

HAIR, The.—If the ladies will trust to our science on the subject of hair, in the first place, we can assure them, most confidently, that, so far is it from being true that oils and pomatums increase the lustre of the hair, their effect is to diminish that polish which it naturally possesses; while, whatever gloss they may give to hair which is naturally dull, is false, and, like all other falsities, disgusting. Absolute cleanliness, by means of water alone, to commence, followed by brushing in the direction of the hair itself in a dry state, is the true method of giving to the hair all the polish of which it is susceptible; and it is the effect of oils of all kinds to disturb or injure this; to say nothing of the disgust and necessary dirtiness of greasy hair. It is the effect of oils

also to prevent it from curling; and this object is most effectually obtained, if without artificial means, by curling it when wet, and suffering it to dry in that state. And, as it happens that almost all hair has a tendency to curl in one direction rather than in another, it is useful to study that tendency, so as to conform to it in the artificial flexure given. As to artificial applications, the whole of the so-called curling-fluids are mere impositions; while one, which is really effectual, and at the same time inoffensive, is a weak solution of isinglass, by which a very firm and permanent form can be given to the hair. The hair should never be twisted, knotted, or pulled contrary to its natural direction, if you would avoid baldness and headache.

Should the scalp be obstinately dry and harsh, it may be safely washed with a cold weak solution of green tea, or with spirits of Castile soap containing a few grains of tannin. In cases of this kind the following may be applied: alcohol eight parts, water eight parts, spirits of harts-horn one part. Cologne water may also be used; but perhaps the best plan under these circumstances, and especially if there be an accumulation of dandruff, is to have the head thoroughly shampooed, after the fashion of the barbers, repeating the operation at intervals until the scalp is perfectly clean, and is stimulated into vigorous, healthful action. Nothing but good can be derived from a due attention to cleansing the hair. Of course, an immoderate use of water is not beneficial. Once a week is perhaps desirable, but this will depend upon the individual.

HAIR, Art of Brushing.—As a general rule, the head cannot be too much brushed, any more than the horse's coat can be too much groomed. The groom knows full well that by plenty of combing and brushing he can not only produce a fine coat, but add very considerably to the healthy condition of the animal. And so it is with man, the more the head be brushed, the more healthy will be the skin, the more healthy its function, namely the production and maintenance of the hair, and, by a reflected power, the more healthy the individual. I find that hair dressers are divided on the subject of brushing, one party recommending soft brushes and small brushing; the other, hard brushes and abundant brushing. As usual, in all these differences, both are right as respects a particular theory; but the brushers have the best of the argument. One has set the question for ever at rest, by the announcement of the following paradox: "You cannot brush the head too much, nor the hair too little."

He is right: you cannot brush the head too much, but as, by clumsy brushing with hard brushes, you might over stretch or tear the hair, and so destroy its beauty, be gentle in your surface brushing; for here you cannot, in combination with the deep brushing, brush too little. The fact is, there are two purposes to be attained by brushing: firstly, to give health to the skin of the head, and strength and vigor to the hair; for which end you cannot brush too much, or use brushes too penetrating or too hard, so long as the skin is not injured; secondly, to smooth the hair, or perhaps go the length of freeing it from dust, for which object your brushes may be as you please, and your hand as light as agreeable. So that, in truth, each according to the purpose

he has in view, may be perfectly right; but, nevertheless, at perfect variance with his brother.

HAIR BRUSHES, To Clean.—Fill a pan with warm water, and dissolve in it a quarter of an ounce of soda to half a gallon of water. Comb out the loose hairs; take one brush at a time by the handle and dip it several times in the water without wetting the back; then rinse in cold water, and put near the fire or in the open air to dry. Never use soap in washing hair brushes, or allow the water to be more than lukewarm, as hot water will soften the bristles and melt the glue in the back, and also turn ivory backs yellow.

HAIR, Bandoline for.—1. Mucilage of clean picked Irish moss, made by boiling a quarter of an ounce of the moss in one quart of water until sufficiently thick, rectified spirit in the proportion of a teaspoonful to each bottle, to prevent its being mildewed. The quantity of spirit varies according to the time it requires to be kept.—2. Gum tragacanth, one drachm and a half; water, half a pint; proof spirit (made by mixing equal parts of rectified spirit and water), three ounces; otto of roses, ten drops; soak for twenty-four hours and strain.—3. This mixture is best made a little at a time. Pour a tablespoonful of boiling water on a dozen quince seeds, and repeat when fresh is required.

HAIR OF CHILDREN.—It is a great mistake to plait the hair of children under eleven or twelve years of age. The process of plaiting more or less strains the hairs in their roots by pulling them tight; tends to deprive them of their requisite supply of nutriment, and checks their growth. The hair of girls should be cut rather short, and allowed to curl freely. When they are about eleven or twelve, the hair should be twisted into a coil, not too tight, nor tied at the end with thin thread, but with a piece of ribbon.

HAIR, Cleaning the.—From the too frequent use of oils in the hair, many ladies destroy the tone and color of their tresses. The Hindoos have a way of remedying this. They take a hand basin filled with cold water, and have ready a small quantity of pea-flour. The hair is in the first place submitted to the operation of being washed in cold water, a handful of the pea-flour is then applied to the head and rubbed into the hair for ten minutes at least, the servant adding fresh water at short intervals, until it becomes a perfect lather. The whole head is then washed quite clean with copious supplies of the aqueous fluid, combed, and afterwards rubbed dry by means of coarse towels. The hard and soft brush is then resorted to, when the hair will be found to be wholly free from all encumbering oils and other impurities, and assume a glossy softness, equal to the most delicate silk. This process tends to preserve the tone and natural color of the hair, which is so frequently destroyed by the too constant use of caustic cosmetics.

HAIR CURLING.—1. Curling fluids are prepared in a variety of ways; the best, however, we are acquainted with is a mixture of olive oil and beeswax. Take a piece of white beeswax, about the size of the kernel of the common nut, melt it in about an ounce of olive oil, and then add a few drops of bergamot.—2. Into a pint of pure olive oil melt slowly a piece of beeswax about the size of a walnut; after which add a quarter of an ounce of oil of rose-

mary and a quarter of an ounce of oil of origanum.—3. Take carbonate of potash (dry), 1 drachm; cochineal, powdered, $\frac{1}{2}$ drachm; water of ammonia, spirit of rose, of each 1 fluid ounce; glycerine, $\frac{1}{4}$ ounce; alcohol, $1\frac{1}{2}$ ounce; distilled water, 18 ounces. Digest with agitation for a week, and then decant or filter. The hair is moistened with it and then loosely adjusted. The effect occurs as it dries.—4. Take borax, two ounces; gum arabic, one drachm; and hot water (not boiling), one quart; stir, and as soon as the ingredients are dissolved add three tablespoonfuls of strong spirits of camphor. On retiring to rest wet the hair with the above liquid, and roll it in twists of paper as usual.—5. At any time you may make your hair curl the more easily by rubbing it with the beaten yolk of an egg, washed off afterwards with clear water, and then putting on a little pomatum before you put up your curls. It is well always to go through this process when you change to curls, after having worn your hair plain.

HAIR, Dressings for.—1. A cheap and very good dressing is made by dissolving four ounces of perfectly pure, dense glycerine in twelve ounces of rose water. Glycerine evaporates only at high temperatures; and therefore under its influence the hair is retained in a moist condition for a long time.—2. Olive oil, 2 pints; otto of roses, 1 drachm; oil of rosemary, 1 drachm. Mix. It may be colored red by steeping a little alkanet root in the oil (with heat) before scenting it. It strengthens and beautifies the hair.—3. Bay rum, 2 pints; alcohol, 1 pint; castor oil, 1 ounce; carb. ammonia, $\frac{1}{2}$ ounce; tincture of cantharides, 1 ounce. Mix them well. This compound will promote the growth of the hair and prevent it from falling out.—4. Take almond oil, $\frac{1}{4}$ of a pound; white wax, $\frac{1}{2}$ an ounce; clarified lard, 3 ounces; liquid ammonia, a $\frac{1}{4}$ fluid ounce; otto of lavender, and cloves, of each 1 drachm. Place the oil, wax, and lard in a jar, which set in boiling water; when the wax is melted, allow the grease to cool till nearly ready to set, then stir in the ammonia and the perfume, and put into small jars for use. Never use a hard brush, nor comb the hair too much. Apply the pomade at night only.—5. (*Pomade*.) Dissolve thoroughly, over a slow fire, 2 ounces of white wax and $\frac{1}{2}$ ounce palm oil, with a flask of the best olive oil. Stir it till nearly cold; then add 1 ounce of castor oil, and about three pennyworth of bergamot, or any other perfume you please.

HAIR DYES.—1. Take 3 parts of litharge and 2 parts of quicklime, both in an impalpable powder and mix them carefully. When used, a portion of the powder is mixed with hot water or milk, and applied to the hair, the part being afterwards enveloped in oil-skin for 4 or 5 hours.

2. Litharge, 2 parts; slaked lime, 1 part; chalk, 2 parts; all finely powdered, and accurately mixed. When required for use, mix the powder with warm water, and dip a brush in the mixture, and rub the hair well with it. After 2 hours let the hair be washed.

3. Mix 5 drachms of fresh slaked lime with $1\frac{1}{2}$ ounces of water; strain through silk, and bottle. Dissolve 5 drachms of acetate of lead in sufficient water, and add enough slaked lime to saturate the acetate acid (a drachm), let it settle, pour off the supernatant liquor, wash the precipitate with water and add it to the milk of lime in the bottle.

4. Sifted lime, 16 ounces; white lead, 2 ounces; litharge, in fine powder, 1 ounce; mix well together and keep dry. To dye black, mix a little of the powder with water to the consistence of cream. To dye brown, use milk, instead of water. Apply with a small sponge to every hair.

5. Litharge, $4\frac{1}{2}$ ounces; quicklime, $\frac{3}{4}$ ounce; reduce to an impalpable powder, and pass it through a sieve. Keep it in a close bottle. When used, wash the hair with soap and water; then with tepid water; wipe it dry and comb with a clean comb. Mix the dye in a saucer, with hot water, to the consistence of cream, and apply it to the hair, beginning at the roots. Place over it four folds of brown paper, saturated with hot water, and drained till cool; and over this an oil-skin cap and a nightcap. Let it remain 4 to 8 hours, according to shade desired. When removed, oil the hair, but do not wet it for 3 or 4 days.

6. Levigated litharge, 11 ounces; powdered quicklime, 75 ounces; hair powder, 37 ounces. Mix. When used, a portion of the powder is mixed with warm water in a saucer, and applied to the hair with the fingers, taking care to cover the hair to the roots. Cover the whole with a sheet of cotton wadding moistened with water, and this with the folded cloth. Let it remain on for 3 hours, or, better, for the night.

7. Washing the hair with the juice of green walnuts, diluted with olive oil, will dye the hair black.

8. (*Morfil's*.) Infuse black tea, two ounces, in one gallon of boiling water; strain and add three ounces of glycerine, half an ounce of tincture of cantharides, and one quart of bay rum. Digest this mixture for a couple of days, and perfume with essence of rose or bergamot, or any other favorite essence to suit the taste.

The following dyes are composed of solutions of nitrate of silver, and in applying them it should be remembered that they stain the skin, as well as the hair. There is, therefore, more difficulty in applying them; they are, however, thought to give a better color to the hair than the ones we have given above:

1. Nitrate of silver, 11 drachms; nitric acid, 1 drachm; distilled water, 1 pint; sap green, 3 drachms; gum arabic, 1 drachm. Mix.

2. Nitric acid, 1 drachm; nitrate of silver, 10 drachms; sap green, 9 drachms; mucilage, 5 drachms; distilled water, $37\frac{1}{2}$ fluid ounces.

3. Silver, 2 drachms; iron filings, 4 drachms; nitric acid, 1 ounce; distilled water, 8 ounces; digest and decant the clear solution. To be carefully applied with a close brush.

4. Sulphuretum of potassæ, 2 drachms; caustic of potassæ, 1 drachm; nitrate of silver, crystallized, 1 drachm; tincture of galls, 1 ounce.

HAIR, Golden.—Golden hair fluids have recently been the subject of continued investigation by an English chemist, who, after a careful analysis, asserts that they are composed of dilute nitric and muriatic acids, with traces, in some instances, of sulphuric acid. Though the proprietors of these fluids announce that the preparations are harmless, yet instances have been reported of ladies being injured by drops of the hair dye falling on their shoulders. The agent to effect the change in the color of the hair is the nitric acid, aided by the chlorine evolved by the decomposition of the muriatic acid.

HAIR, Gray.—It has been recently assert-

ed that an undue proportion of lime in the system is the cause of premature gray hair, and we are advised to avoid hard water, either for drinking pure or when converted into tea, coffee, or soup, because hard water is strongly impregnated with lime. Hard water may be softened by boiling it: let it become cold, and then use it as a beverage. It is also stated that a liquid that will color the human hair black, and not stain the skin, may be made by taking one part of bay rum, three parts of olive oil, and one part of good brandy, by measure. The hair must be washed with the mixture every morning, and in a short time the use of it will make the hair a beautiful black, without injuring it in the least. The articles must be of the best quality, mixed in a bottle, and always shaken well before being applied.

HAIR, To prevent turning Gray.—A good remedy for the hair turning gray and falling off is the following: Distill two pounds of honey, a handful of rosemary, and twelve handfuls of the tendrils of grape vine, infused in a gallon of new milk; about two quarts of water will be obtained from this, which apply to the hair frequently.

HAIR, Loss of.—One of the most unpleasant consequences of early neglect is the constant falling off of hair. We do not allude to the loss of the hair dependent on age; that is a natural consequence of our infirmity, and cannot be regarded in the light of a disorder; but instances in which the hair has become thin, even to disfigurement, in early life, are far from being uncommon, and, if neglected, must terminate in confirmed baldness. This excessive loosening of the hair, however, is far from being so irreparable as is generally imagined, and if proper treatment be adopted, the hair will grow fresh, and assume all its original vigor and strength.

The head must be bathed daily with cold water, into which a little eau de cologne has been poured, and the scalp should then be brushed until the skin becomes red, and a warm glow is produced. Cold water is one of the finest cosmetics known, and has this advantage, that while in almost every instance it improves the hair, in no case can it do injury.

HAIR, To Restore.—Onions rubbed frequently on the part requiring it. The stimulating powers of this vegetable are of service in restoring the tone of the skin, and assisting the capillary vessels in sending forth new hair; but it is not infallible. Should it succeed, however, the growth of these new hairs may be assisted by the oil of myrtle berries, the repute of which, perhaps, is greater than its real efficacy.

HAIR WASHES.—1. Take glycerine, 2 oz.; tincture of myrrh, 1 oz.; cologne, 1 oz.; tincture of cantharides, $\frac{1}{2}$ oz.; distilled water, 24 ounces. Mix.—2. Red wine, 1 pound; salt, 1 drachm; sulphate of iron, 2 drachms; boil for a few minutes, and add common verdigris, 1 drachm; leave it on the fire 2 minutes; withdraw it, and add 2 drachms of powdered nutgall. Rub the hair with the liquid; in a few minutes dry it with a warm cloth, and afterwards wash with water.—3. Take elder water, $\frac{1}{2}$ a pint; sherry wine, $\frac{1}{2}$ a pint; tincture of arnica, $\frac{1}{2}$ an ounce; alcoholic ammonia, 1 drachm—if this last-named ingredient is old, and has lost its strength, then two drachms instead of one may be employed. The whole of these are to be mixed in a lotion bottle, and applied to the head every night with

a sponge. Wash the head with warm water twice a week. Soft brushes only must be used during the growth of the young hair.

HAIR, Superfluous.—Any remedy is doubtful; many of those commonly used are dangerous. The safest plan is as follows:—The hairs should be perseveringly plucked up by the roots, and the skin, having been washed twice a-day with warm soft water, without soap, should be treated with the following wash, commonly called milk of roses. Beat four ounces of sweet almonds in a mortar, and add half an ounce of white sugar during the process; reduce the whole to a paste by pounding; then add, in small quantities at a time, eight ounces of rose water. The emulsion thus formed, should be strained through a fine cloth, and the residue again pounded, while the strained fluid should be bottled in a large stopped vial. To the pasty mass in the mortar add half an ounce of sugar, and eight ounces of rose water, and strain again. This process must be repeated three times. To the thirty-two ounces of fluid, add twenty grains of the bichloride of mercury, dissolved in two ounces of alcohol, and shake the mixture for five minutes. The fluid should be applied with a towel, immediately after washing, and the skin gently rubbed with a dry cloth till perfectly dry. Wilson, in his work on Healthy Skin, writes as follows:—Substances are sold by the perfumers called depilatories, which are represented as having the power of removing hair. But the hair is not destroyed by these means; the root and that part of the shaft implanted within the skin still remain, and are ready to shoot up with increased vigor as soon as the depilatory is withdrawn. The effect of the depilatory is the same, in this respect, as that of a razor, and the latter is, unquestionably, the better remedy. It must not, however, be imagined that depilatories are negative remedies, and that, if they do no permanent good, they are, at least, harmless; that is not the fact; they are violent irritants, and require to be used with the utmost caution. After all, the safest depilatory is a pair of tweezers and patience.

HANDS.—Dirty and coarse hands are no less the marks of slothfulness and low breeding, than clean and delicate hands are those of cleanliness and gentility. To promote the softness and whiteness of the skin, mild emollient soaps, or those abounding in oil, should alone be used, by which means chaps and chilblains will generally be avoided. The coarse, strong kinds of soap, or those abounding in alkali, should for a like reason be rejected, as they tend to render the skin rough, dry, and brittle. The immersion of the hands in alkaline lyes, or strongly acidulated water, has a like effect. When the hands are very dirty, a little good soft soap may be used with warm water, which will rapidly remove oily and greasy matter. Fruit and ink stains may be taken out by immersing the hands in water slightly acidulated with oxalic acid, or a few drops of oil of vitriol, or to which a little pearlash or chloride of lime has been added, observing afterwards to well rinse them in clean water, and not to touch them with soap for some hours, as any alkaline matter will bring back the stains, after their apparent removal by all the above substances, except the last.

HANDS, Blistering of.—The best remedy against the blistering of the hands by rowing or

fishing, or of the feet by walking, is to light a tallow candle; let the tallow drop into water (to purify it from salt), then mix the tallow with a little brandy, or any other strong spirit, and rub it well into the hands or feet.

HANDS, to Beautify.—1. Rub together in a mortar four parts by weight of yolk of egg with five parts of glycerine. No better ointment for the hands can be procured. The compound may be preserved for years.—2. Take three drachms of camphor gum, three do. white bees-wax, three do. spermaceti, two ounces of olive oil—put them together in a cup upon the stove where they will melt slowly and form a white ointment in a few minutes. If the hands be affected, anoint them on going to bed, and put on a pair of gloves.—3. Take two ounces of Venice soap, and dissolve it in two ounces of lemon juice. Add one ounce of the oil of bitter almonds, and a like quantity of oil of tartar. Mix the whole, and stir it well until it has acquired the consistency of soap; and use it as such for the hands.

The paste of sweet almonds, which contains an oil fit for keeping the skin soft and elastic, and removing indurations, may be beneficially applied to the hands and arms.

HANDS, Chapped.—1. Glycerine and rose-water, of each $\frac{1}{2}$ oz.; mix, and rub it on the back part of the hands night and morning. They will require very few applications before they are well.—2. (*Glycerine Lotion.*) This useful and pleasant application for chapped hands is prepared by simmering one drachm of quince seed in half a pint of boiling water for ten minutes, straining the mucilage, and mixing one part with one part of inodorous glycerine and six parts of orange flower or rose water. A little borax may be added if desirable.—3. Melt tallow, and add a little powdered camphor and glycerine, with a few drops of oil of almonds to scent. Pour in molds and cool.—4. Put together equal weights of fresh, unsalted butter, mutton tallow, bees-wax, and stoned raisins; simmer until the raisins are done to a crisp, but not burned. Strain and pour into cups to cool. Rub the hands thoroughly with it, and though they will smart at first, they will soon feel comfortable and heal quickly.—5. The easiest and simplest remedy is found in every store-room. Take common starch, and grind with a knife until it is reduced to the smoothest powder. Take a clean tin box and fill it with starch thus prepared, so as to have it continually at hand for use. Then, every time that the hands are taken from the suds, or dish-water, rinse them thoroughly in clear water, wipe them, and while they are yet damp, rub a pinch of the starch thoroughly over them, covering the whole surface. The effect is magical. The rough, smarting skin is cooled, soothed and healed, bringing and insuring the greatest degree of comfort and freedom from this, by no means insignificant trial.

HANDS, Redness and Burning of.—Redness and burning of the hands is caused by defective circulation. The best remedy is to protect them as much as possible from the cold when out of doors, by using a muff or by wearing two pairs of gloves, which are much warmer than one pair lined. To prevent the burning sensation, hold the hands for a few minutes in very warm water after coming in, as that generally produces a feeling of coolness afterwards, whereas cold water causes a glow after it has been used.

HANDS, To Soften.—After cleansing the hands with soap, rub them well with oatmeal while wet.

HANDS, To Remove Stains from.—Damp the hands first in water, then rub them with tartaric acid, or salt of lemons, as you would with soap; rinse them and rub them dry. Tartaric acid, or salt of lemons will quickly remove stains from white muslin or linens. Put less than half a teaspoonful of salt or acid into a table-spoonful of water; wet the stain with it, and lay it in the sun for an hour; wet it once or twice with cold water during the time; if this does not quite remove it, repeat the acid water, and lay it in the sun.

HANDS, To Whiten.—1. Stir a $\frac{1}{4}$ of a pound of Castile soap, and place it in a jar near the fire, pour over it $\frac{1}{2}$ pint of alcohol; when the soap is dissolved and mixed with the spirit, add 1 ounce of glycerine, the same of oil of almonds, with a few drops of essence of violets, or otto of roses, then pour it into molds to cool for use.—2. A wine-glassful of eau de cologne, and one of lemon juice, two cakes of brown Windsor soap, mixed well together, when hard, will form an excellent substance.

HEAD, Scurf in.—A simple and effectual remedy. Into a pint of water drop a lump of fresh quick lime, the size of a walnut; let it stand all night, then pour the water off clear from the sediment or deposit, add a quarter of a pint of the best vinegar, and wash the head with the mixture. Perfectly harmless; only wet the roots of the hair.

LIPS, Chapped.—Take two ounces of white wax, one ounce of spermaceti, four ounces of oil of almonds, two ounces honey, quarter of an ounce of essence of bergamot, or any other scent. Melt the wax and spermaceti; then add the honey, and melt all together, and when hot, add the almond oil by degrees, stirring it till cold.—2. Take oil of almonds, 3 ounces; spermaceti, $\frac{1}{2}$ ounce; virgin rice, $\frac{1}{2}$ ounce. Melt these together, over a slow fire, mixing with them a little powder of alkanet root, to color it. Keep stirring till cold, and then add a few drops of the oil of rhodium.—3. Take oil of almonds, spermaceti, white wax, and white sugar candy, equal parts. These form a good white lip salve.

MOTH PATCHES, To Remove.—Wash the patches with solution of common bicarbonate of soda and water several times during the day for two days, or until the patches are removed, which will usually be in forty-eight hours. After the process wash with some nice toilet soap, and the skin will be left nice, smooth and clear of patches.

NAILS (The), Care of.—The nails should be kept clean by the daily use of the nail brush and soap and water. After wiping the hands, but while they are still soft from the action of the water, gently push back the skin which is apt to grow over the nails, which will not only preserve them neatly rounded, but will prevent the skin cracking around their roots, (nail springs), and becoming sore. The points of the nails should be pared at least once a week; biting them should be avoided.

NAILS, Biting the.—This is a habit that should be immediately corrected in children, as, if persisted in for any length of time, it permanently deforms the nails. Dipping the finger-ends in some bitter tincture will generally pre-

vent children from putting them to the mouth; but if this fails, as it sometimes will, each finger-end ought to be encased in a stall until the propensity is eradicated.

NAILS, To Whiten.—The best wash for whitening the nails is two drachms of diluted sulphuric acid, one drachm of tincture of myrrh, added to four ounces of spring water; first cleanse the hands, and then apply the wash.

NOSES (Large), To Make Small.—Dr. Cid, an inventive surgeon of Paris, noticed that elderly people, who for a long time have worn eyeglasses supported on the nose by a spring, are apt to have this organ long and thin. This he attributes to the compression which the spring exerts on the arteries by which the nose is nourished. The idea occurred to him that the hint could be made useful. Not long afterward, a young lady of fifteen years consulted him, to see if he could restore to moderate dimensions her nose, which was large, fleshy, and unsightly. The trait, he found, was hereditary in her family, as her mother and sister were similarly afflicted. This was discouraging, as hereditary peculiarities are particularly obstinate. But the doctor determined to try his method; he took exact measurements, and had constructed for her a "lunette pince-nez"—a spring and pad for compressing the artery—which she wore at night and whenever she conveniently could in the daytime. In three weeks a consolatory diminution was evident, and in three months the young lady was quite satisfied with the improvement in her features.

PIMPLES.—Several different forms of eruptions are popularly termed pimples, though varying considerably in their character. As this article is designed for general reading, we shall adopt the popular appellation. Dry pimples consist of little elevations sometimes showing themselves on the surface, at other times perceptible only to the touch. They usually itch considerably, and when scratched to allay the feeling, are liable to be converted into disagreeable sores. We know of no better remedy for these than a solution of borax in warm water, afterward allowed to cool. This applied plentifully as a wash or lotion will soothe the irritation.

Matterly pimples are distinguished from the above by containing an opaque, yellowish fluid (pus). The little bubbles attain their full size in the course of two or three days, and either dry up without breaking or more frequently burst and then dry, forming a hard crust. For these are recommended a lotion composed of alcohol one part and five or six parts of soft water, to which a very little distilled vinegar is added. The crusts may be removed by warm water.

Watery pimples consist of little vesicles or bladders filled with transparent liquid. No local treatment is usually available.

In the treatment of pimples, attention should be directed to improving the general health, promoting activity of the skin by exercise, frequent bathing of the whole body, and the avoidance of pastry, rich gravies and similar articles of food. Pimples generally afflict persons of sedentary habits, especially those confined in close, impure atmospheres. Where the skin becomes torpid, the great amount of waste usually passing off in the form of insensible perspiration gathers at the openings of the pores and clogs them. If bathing is not frequent this layer of dead matter forms a coating through which the insensible perspiration

(or wastes usually passed from the skin) are prevented an egress and collect in pimples. It is probable that the reason of the face being most frequently the part disfigured, is because it is more frequently washed, the waste matter seeks an outlet wherever the skin can act, and so too much accumulates here to be thrown off easily. The use of warm water for daily ablutions promotes this attraction of waste matter to the spot. By washing the face in very cold water and bathing the body frequently in warm water the order is reversed, and the excess of the face is drawn to other parts and, diffused over a large surface, passes off naturally and without any marked signs.

Pimples frequently indicate a debilitated state of the blood, are common in enervated systems. Strengthen the system, promote the purification of the blood by breathing fresh air, and aid the throwing off of waste matters by frequent bathing and gentle friction of the body. The bowels should be kept regular by proper food, such as fruits, vegetables, and particularly oat-meal.

The lotions, beautifiers, etc., usually sold consist of borax water, glycerine in water, with a little perfume, or the deadly preparations from poisonous substances. One of the "remedies" advertised was found to contain corrosive sublimate. Camphor is frequently prescribed by newspapers, and forms an ingredient in some of the proprietary preparations. It does not appear to do any good, and is liable if used to any considerable extent to exert a paralyzing influence—in some cases even to the extent of total loss of power and sensation in the parts to which it is applied. It is also liable to drive in eruptions, causing internal trouble. Alum applied to the face occasionally, especially after shaving, has been found in some cases very useful in checking pimples.

Smashing pimples, or squeezing out "flesh worms," only tends to an increase of the trouble. If a large pimple seems inclined to form, the best way is to let it come fully to a head, then prick it with a needle and gently press out the matter, breaking the skin as little as possible. This will help to clear the face. Borax water is a simple, harmless and often beneficial application to pimples and inflamed or irritated skin, and in cases of chaps, sunburn, or harshness of the skin.

SKIN, To Whiten and Soften.—1. Take white wax (pure), 1 ounce; spermaceti, 2 ounces; oil of almonds, 9 ounces; melt together by a moderate heat in a glazed earthenware vessel, and add glycerine (best), 3 ounces; balsam of Peru, $\frac{1}{2}$ ounce. The mixture is to be stirred until nearly cold.—2. Take a $\frac{1}{4}$ of a fluid ounce, each, of tincture of tolu, tincture of benzola, and tincture of balsam of Peru, and gradually mix with them a $\frac{1}{4}$ of a pint of distilled elder water, when a milky emulsive fluid will be the result. Then have, ready melted in a basin, $\frac{1}{2}$ an ounce of virgin wax and spermaceti, together with a $\frac{1}{4}$ of a pound of almond oil—this is best done by placing the ingredients in a basin set on to a small saucepan of boiling water, thus to melt the materials by steam. Finally, the tincture and water mixture is to be gradually poured into the basin of oil, sperm, etc., beating the mixture rapidly with a fork, so as to insure perfect blending of all the ingredients. When finished, the unguent assumes a beautiful snow-white creamy consistency, which finally sets when quite cold. To whiten the hands, rub them over with the

sultana unguent on going to bed, and sleep in an old pair of kid gloves. To prevent wrinkles and preserve the skin, apply the unguent at night, washing it off in the morning with cold cream soap. There is scarcely a wound, bruise, or skin-blotch but what it may be applied to with "safety and with succor."

SUNBURN and TAN.—1. Take two drachms of borax, one drachm of Roman alum, one drachm of camphor, half an ounce of sugar-candy, and a pound of ox-gall. Mix, and stir well for ten minutes or so, and repeat this stirring three or four times a day for a fortnight, till it appears clear and transparent. Strain through blotting paper, and bottle up for use.—2. Milk of almonds made thus: Take of blanched bitter almonds half an ounce, soft water half a pint; make an emulsion by beating the almonds and water together, strain through a muslin cloth, and it is made.—3. A preparation composed of equal parts of olive oil and lime water is also an excellent remedy for sunburn.

TAN, To Remove.—Tan may be removed from the face by mixing magnesia in soft water to the consistency of paste, which should then be spread on the face and allowed to remain a minute or two. Then wash off with castile soap suds, and rinse with soft water.

TEETH, Care of.—The mouth has a temperature of ninety-eight degrees, warmer than is ever experienced in the shade in the latitude of New England. It is well known that if beef, for example, be exposed in the shade during the warmest of our summer days, it will very soon begin to decompose. If we eat beef for dinner, the particles invariably find their way into the spaces between the teeth. Now if these particles of beef are not removed, they will frequently remain till they are softened by decomposition. In most mouths this process of decomposition is in constant progress. Ought we to be surprised that the gums and teeth against which these decomposing or putrefying masses lie should become subjects of disease?

How shall our teeth be preserved? The answer is very simple—keep them clean! How shall they be kept clean? Answer: by a tooth-pick, rinsing with water, and the daily use of a brush.

The tooth-pick should be a quill, not because the metallic picks injure the enamel, but because the quill pick is so flexible it fits into all the irregularities between the teeth.

Always after using the tooth-pick the mouth should be thoroughly rinsed. If warm water be not at hand, cold may be used, although the warm is much better. Closing the lips, with a motion familiar to all, everything may be thoroughly rinsed from the mouth.

Every morning (on rising) and every evening (on going to bed) the tooth-brush should be used, and the teeth, both outside and inside, thoroughly brushed.

Much has been said, pro and con, upon the use of soap with the tooth-brush. My own experience and the experience of members of my family is highly favorable to the regular morning and evening use of soap. Castile or other good soap will answer this purpose. (Whatever is good for the hands and face is good for the teeth.) The slightly unpleasant taste which soap has when we begin to use it will soon be unnoticed.

TEETH, To Beautify.—Dissolve two ounces

of borax in three pints of boiling water, and before it is cold add one teaspoonful of the spirits of camphor, and bottle for use. A tablespoonful of this mixture, with an equal quantity of tepid water, and applied daily with a soft brush, preserves and beautifies the teeth, extirpates all tartarous adhesion, arrests decay, induces a healthy action of the gums, and makes the teeth pearly white.

TEETH (Loose), To Fasten.—To fasten loose teeth and strengthen the gums: Dissolve an ounce of myrrh as much as possible in a pint of port wine, and the same quantity of oil of almonds; wash the mouth with this fluid every morning.

TEETH and GUMS, Wash for.—The teeth should be washed night and morning, a moderately small and soft brush being used; after the morning ablution pour on a second tooth-brush, slightly damped, a little of the following lotion. Carbolic acid, 20 drops; spirit of wine, 2 drachms; distilled water, 6 ounces. After using this lotion for a short time the gums become firmer and less tender, and impurity of the breath (which is most commonly caused by bad teeth) will be removed. It is a great mistake to use hard tooth-brushes, or to brush the teeth until the gums bleed.

TOOTH POWDERS.—Many persons, while laudably attentive to the preservation of their teeth, do them hurt by too much officiousness. They daily apply to them some dentifrice powder, which they rub so hard as not only to injure the enamel by excessive friction, but to hurt the gums even more than by the abuse of the tooth-pick. The quality of some of the dentifrice powders advertised in newspapers is extremely suspicious, and there is reason to think that they are not altogether free from a corrosive ingredient. One of the safest and best compositions for the purpose is a mixture of two parts of prepared chalk, one of Peruvian bark, and one of hard soap, all finely powdered, which is calculated not only to clean the teeth without hurting them, but to preserve the firmness of the gums.

Besides the advantage of sound teeth for their use in mastication, a proper attention to their treatment conduces not a little to the sweetness of the breath. This is, indeed, often affected by other causes existing in the lungs, the stomach, and sometimes even in the bowels, but a rotten state of the teeth, both from the putrid smell emitted by carious bones and the impurities lodged in their cavities, never fails of aggravating an unpleasant breath wherever there is a tendency of kind kind.

TOILET, The.—In the first requisite, viz., that of dress, we may say, health and comfort first, ornament next. The dress should be plain, neat, clean, loose, and rather light than heavy. It should be plain and neat, because these are the elements of true beauty; and because God clothed our first parents in simple skins, thus showing the great design of dress to be utility, and not ornament. Dress should be clean because it is demanded by decency and good taste; it should be loose and light so as to avoid all oppression and restraint, so that every muscle may have the most perfect freedom of motion, while mind and body are equally at ease.

TOILET VINEGAR.—Half a pint of Bordeaux, or of the best white wine vinegar; half a pint of pale rum; essence of bergamot, rosemary,

and marjoram, a drachm each; and one pint of rose or elder flower water. Mix the perfumes with the spirit, then add the vinegar, and lastly, the rose water. If not perfectly bright it may be strained through blotting paper.

WARTS, To Remove.—1. Pare the hard and dried skin from their tops, and then touch them with the smallest drop of strong acetic acid, taking care that the acid does not run off the wart upon the neighboring skin, for if it do, it will occasion inflammation and much pain. If this practice be continued once or twice daily, with regularity, paring the surface of the wart occasionally, when it gets hard and dry, the wart may be

soon effectually cured.—2. A mixture of two parts of nitric acid to one of muriatic acid is a good remedy for warts. It should be applied to the warts with a small brush from a broom, and care must be taken not to get acid on the flesh, as it will make a sore. Saleratus will counteract the action of the acid.

WHISKERS, To make Grow.—Shave the beard at least three times a week, and use the following as a stimulant: cologne, 1 ounce; alcohol, 1 pint; castor oil, $\frac{1}{2}$ pint; oil of cloves, 20 drops; oil of bergamot, 20 drops; tincture of cantharides, 2 ounces.

WARDROBE

BALLS for Scouring Cloths, etc.—1. Fuller's earth, 2 lbs.; soap, 1 lb.; turpentine, 2 oz.; ox gall enough to make a paste.—2. Fuller's earth, whiting, and pipe clay, equal parts, ox gall enough to make a paste. These are used to remove grease from cloth, or stains from clothes.

CLOTHING, Hints about.—All our garments should be soft and pliable, and of such a shape as to be comfortable to the wearer. They should not be warmer than is requisite to preserve the body in a proper temperature. The clothing worn next the skin should be made of substances easily cleaned. Our dress should be adapted to the age and constitution of the individual. Young and robust persons require a smaller quantity than those who are delicate or advanced in years. A variety is requisite to suit the difference of temperature in summer and winter. The temperature varies so often and so suddenly during the first five months of the year, that no great change in the character of our clothing should be made till May or June. Light colored clothes are cooler in summer, because they reflect a portion of the sun's rays; and they are warmer in winter, because they do not radiate the heat of the body so rapidly as dark colored clothing. Dark colored clothes are warmest in summer, because the darker the cloth, the more perfectly it absorbs the direct heat of the sun. They are, however, colder in winter than light colored clothing, proving the rapidity with which they absorb the heat from the body.

CLOTHES, To Brush.—Have a wooden horse to put the clothes on, and a small cane to beat the dust out of them; also a board or table long enough for them to be put their whole length when brushing them. Have two brushes, one a hard bristle, the other soft; use the hardest for the great coats, and for the others when spotted with dirt. Fine cloth coats should never be brushed with too hard a brush, as they will take off the nap, and make them look bare in a little time. Be careful in the choice of the cane, do not have it too large, and be particular not to hit too hard. Be careful also not to hit the buttons, for it will scratch, if not break them; therefore a small handwhip is the best to beat with.

If a coat be wet and spotted with dirt, let it be quite dry before brushing; then rub out the

spots with the hands, taking care not to rumple it in so doing. If it want beating, do as before directed, then put the coat at its full length on a board; let the collar be towards the left hand, and the brush in the right. Brush the back of the collar first, between the two shoulders next, and then the sleeves, etc., observing to brush the cloth the same way that the nap goes, which is towards the skirt of the coat. When both sides are properly done, fold them together, then brush the inside, and last of all the collar.

CLOTHES, To Renovate.—To warm soft water 4 gals., put in 1 beef's gall; saleratus, $\frac{1}{2}$ lb. Dissolve. Lay the garment on a bench and scour every part thoroughly by dipping a stiff brush into the mixture; spots of grease and the collar must be done more thorough, and longer continued than other parts, and rinse the garment in the mixture by raising up and down a few times, then the same way in a tub of soft cold water; press out the water and hang up to dry; after which it needs brushing the way of the nap and pressing well under a damp cloth.

Beef's gall will set the color on silks, woolen, or cotton—one spoon to a gallon of water is sufficient for this purpose. Spotted bombazine or bombazette washed in this will also look nearly equal to new.

CLOTH (or Clothing), To render Waterproof.—Several inquiries have been made of us, lately, respecting the mode of preparing cloth to render it waterproof, and yet maintain its porosity. Close waterproof cloth fabrics, such as glazed oil cloth, India rubber, and gutta percha cloth are completely waterproof, but do not permit perspiration and the exhaled gases from the skin to pass through them, because they are air tight as well as water tight. Persons who wear air tight garments soon become faint, if they are undergoing severe exercise, such as that to which soldiers are exposed when on march. A porous, waterproof cloth, therefore, is the best for outer garments during wet weather, for those whose duties or labor causes them to perspire freely. The best way for preparing such cloth is by the process adopted for the tunics of the French soldiers during the Crimean war. It is as follows: Take $2\frac{1}{4}$ pounds of alum and dissolve this in 10 gallons of boiling water; then in a separate ves-

sel dissolve the same quantity of sugar of lead in 10 gallons of water, and mix the two solutions. The cloth is now well handled in this liquid, until every part of it is penetrated; then it is squeezed and dried in the air, or in a warm apartment, then washed in cold water and dried again, when it is fit for use. If necessary, the cloth may be dipped in the liquid and dried twice before being washed. The liquor appears curdled, when the alum and lead solutions are mixed together. This is the result of double decomposition, the sulphate of lead, which is an insoluble salt, being formed. The sulphate of lead is taken up in the pores of the cloth, and it is unaffected by rains or moisture, and yet it does not render the cloth air tight. Such cloth is also partially non-inflammable. A solution of alum itself will render cloth, prepared as described, partially waterproof, but is not so good as the sulphate of lead. Such cloth—cotton or woolen—sheds rain like the feathers on the back of a duck.

CLOTHING, Water-tight.—Balard recommends the application of acetate of alumina for the purpose of rendering clothing impervious to water. The cloth is to be immersed in a mixture of solutions of acetate of lead and sulphate of alumina; by mutual decomposition of the salts, acetate of alumina is produced on the cloth, and when the goods are dried, basic acetate of alumina adheres to the fiber, and thus protects it from the action of moisture. The process is particularly recommended for military goods.

DRESSES, Uninflammable.—It is much to be regretted that the process of rendering the material of ladies' muslin dresses uninflammable is not more generally understood and used. Either of three substances—phosphate of ammonia, tungstate of soda, and sulphate of ammonia, can be mixed in the starch, and at the cost of two cents a dress, deaths from burned garments can be rendered impossible. Articles of apparel subjected to those agents can, if they burn at all, only smoulder; and in no case can they blaze up in the sudden and terrible manner in which so many fatal accidents have occurred to the fair wearers of crinoline.

GARMENTS, To Make and Cut.—*A Dress, (the Waist).*—Measure the lady you are going to fit with an inch measure. First, under the arm, down the seam of shoulder, across the chest from seam to seam, I mean the seam under the arm. Length from throat to waist. Length of back to waist. Across the back the same way as front. Cut in common lining the paper pattern nearest your measure. Leave turnings, or cut your pattern larger in any part (if required) half an inch. In making up your lining to fit, pin the body together on shoulder and under the arm. Tack the plaits or run them up with cotton. Take the lady's measure over her gown, but fit it on without it. Before you begin to cut, have a piece of paper ready written in the following manner, detailing in inches the respective measurements; for instance, a middle size would be something near these proportions:

Under the arm	8
Shoulder	7 1-2
Chest	19
Length of front	17
Length of back	15 1-2
Across the back	15

If for yourself, and you have no paper pattern that fits, unpick half an old body that fits well;

lay your new lining on your cutting board, with an old body on top of it, and with your piercer prick through both, in the old stitches of your body pattern; prick them well, as the marks are apt to rub out; tack all the body well in the holes round it, before you begin, and be very careful to stitch your body to the tacking thread; take care and attend to this. Five out of six persons have their dresses made too tight across the chest; it is a sad fault; I have many times seen waists out of reason in length, and the front two inches too narrow; if a penknife were run up the middle, it would burst open; when I had occasion to do it, I have never found any one willing to have the seam sewn up again; and I feel convinced, that any lady, once wearing an easy dress, would never go back to a tight one; to say nothing of its being healthy and beautiful. Great care must be taken with the arm-holes; do not make them too large or too small; thirteen inches is a nice size for a person not more than twenty-four inches in the waist; fourteen inches is a large size, only required for stout persons. If you have to alter the arm-hole, never do it under the arm; in nine cases out of ten, it will spoil the dress, and it takes away the free use of the arm; a very small piece cut off round the armhole, except underneath, will be all that is necessary. Do not forget your sleeve must be larger than the arm-hole an inch and a half; when put in, it never looks the least full, and sets better. The seam of your sleeve must not be even with the seam of your body, but half an inch in front of it. In cording the neck, do not stretch it; hold the cord tight. The waist must, on the contrary, be pulled well, when the cord is put on, or it will never fit; it requires much stretching. The fit of the body often depends on the finishing of the waist. In putting on a waistband, let it be larger than the body; the fashion at the present moment, I am glad to say, is not carried to the extreme; the waists are moderate in length, and I do hope sensible women will cease to think tight waists are an ornament. Nothing is so beautiful as nature, if we only let it alone; it is presumption to think we can improve it; so much has been said by all our clever physicians on this subject, that more than a passing remark from me will be unnecessary. It is a common error to make the backs of a dress of a different size; both halves should be of the same size; as one comes under, and the other over, they must of course wrap equal, and certainly require to be both alike. Put the hooks not more than one inch apart, and a quarter of an inch from the edge of the back. If the dress fastens in front, make the fastenings the same; and I think a hem down the back a decided improvement; it takes off the width of the back, for narrow backs and wide chests are what is considered right. In gathering a body at the waist, if it is at all thick material, gauge it with strong silk or thread and large stitches, for it is a small compass it has to be put in; all full bodies are made with quite a straight piece of material, twenty inches long and eighteen wide; this is half the front; gather it straight at the bottom, and then place it on your tight lining; fix it firmly, and then gather it at the shoulder; but mind and do the bottom gauging first; to make a body with folds, still have your material twenty inches long, and nineteen wide; the selage must reach from waist to shoulder.

Have the piece on a table before you, and make about four folds quite straight; lay them on your lining, push them close together at the waist, and pull them wider apart at the shoulder. I find it makes the folds set better, to cover over half the body-lining with a plain piece of the dress, like you would wear a stomacher, and then place your folds to meet it; so that a folded body will be in two pieces, the plain part put on first, and then the folds after. In putting folds on a body, let it be on the straight, or a good across; don't let it be neither one nor the other, which is too frequently the case, and always will, as a matter of course, set badly; do not put your folds into the neck—let them come toward the shoulder; it winds the chest; they had better be laid a little on the sleeves, then pushed all toward the neck. In making your body-lining ready to put on the part, be careful it is very exact and smooth, and mind your body is neat inside as well as out; don't let raw edges be seen; turn them, so that the outside fullness or plaits cover what you can, and make the seam under the arm and on the shoulder neat, by sewing them over with white cotton; that is, if your body is lined with white, which it certainly ought to be. Do not have the lining too stout. It will not give easily to the figure. A yard and a quarter is plenty for a moderate-sized person. Use little or no whalebone. Let it be in thin strips which will give to the form. Be sure to give ease in the arm-hole, and width in the chest, whether for a dress or jacket. Be "sure you are right" before you "go ahead;" that is, look to see if you have the pattern of the material all running in the same direction, the two halves of the front and back cut for the opposite sides, the breadths of the skirt the same length, etc., etc., else the scissors will do sad mischief. If you are inexperienced, look twice and baste carefully. Trust nothing to chance; you can not be too precise. You will save time and labor in the end, by being very particular about the fastening. It is the soul of nice work.

In cutting the sleeve, measure the length of the arm from the shoulder to the wrist, over the bent elbow, no matter what the fashion of the sleeve may be. If a bishop-sleeve, it should be allowed long over the elbow, allowing at least four inches for the droop, and shorter on the inner seam. Remember to slope the top of the sleeve for the arm-hole, not both sides alike, but with the upper half curving in, say, half an inch; also to allow one inch and a half to be taken up in sewing in the sleeve—that is, allow the sleeve to be that much larger than the arm-hole; it will look plain when sewn in.

Open sleeves should be lined as far back as they are seen, either with a piece of the dress material, or with silk. White silk is used as a lining for black and other colors. If a rich dress, the lining should be finished off with a ruck of white ribbon, or black lace, just showing over the edge.

If the caps of sleeves are sloped like the sleeves, at the top, they will set down too close; they should be hollowed in, a little, on the top.

Trimming should be sewn on strong but lightly; never dragged in the least; hold it a little full.

In making the skirt, supposing you have measured over your material, have your inch measure ready to cut the skirt from it. It is a good plan

to write down in a little book the number of inches long your skirt is required. Measure it at the back of the dress, and then from the seam under the arm. The slope begins here, and gradually goes to the point. Lay the skirt on a table, and have both halves exact, pin them together at the bottom, and pull them even at the top. A dressmaker would have a person to hold the skirt at the bottom, while she made it even at the top. Put seam to seam. Care should be taken to cut your skirt even, every breadth the same length; and let your seams be nicely pinned before you begin to run them. Make yourselves a heavy cushion, to pin your seams to. A common brick covered makes a very good one. In cutting off the skirt, if the length, we will suppose, should be forty-two or forty-six inches long, leave four inches more for the hem and turnings at the top. Cut the lining for the skirt exact to the material, and mind it fits when finished. Supposing you have to run the seams of the skirt and the seams of your lining, lay the lining on the table, placing the skirt on top, and then tack the seams of your skirt to the lining. Begin at the first seam, and gradually go on to the last seam; stitch up three pieces together, and fell over the fourth; having done this, hem the bottom. Fix your hem all round before you begin, and do not take the stitches through unless your hem is tacked or pinned: it will be sure to be on the twist, and set badly.

Having done this, run on your braid, which must be put on easy or rather full. Attend to this, or you will spoil the set of the skirt. If the skirt is to have flounces, they must be put on before you gauge the top; and while the skirt is on the table, put a white tacking-thread round the skirt where each flounce is to be fixed. Flounces take the same quantity of material if cut either on the straight or the cross. It is a common error to suppose they take more on the cross. For the fullness of a flounce, allow one width on the cross to one width on the straight of your skirt; so that if you have six widths in your skirts, you will have six widths in your flounces on the cross. If there are three flounces of different widths, let the bottom and widest one have the most fullness; three inches more fullness will be sufficient. If the flounces are on the straight, allow eight widths in the flounce to six widths in the skirt. A small cord run in at the top of the flounce makes it look neat. Before running the cord in your flounce, join it round the exact size of the skirt; join round likewise your flounces, and full them on the cord as you go on. Halve and quarter your flounces and also your skirt, and you will find them no trouble to put on.

To cut flounces on a good cross, have the material on a table, and turn down one corner in the exact shape of half a pocket handkerchief, and then cut it through. In turning down your half, try two ways: one way lays flat on the table when folded, and the other does not look so flat; cut through the latter. In silk there is no perceptible difference which way you cut it; but in crape you will very easily observe it. Take any piece you have by you, and try it while reading this. Now begin to turn down your material on the cross, like a gentleman folds his neckerchief; keep folding until you have the number of pieces you want for one flounce, and keep each one pinned to the other as you fold them, so as to

leave them all exact in width. Mind the edges measure exact. Supposing you to keep turning each one as you fold it. If the flounces are to be nine inches, cut the selvage the same depth. Some persons are at a loss to know how much three or four flounces will take. Supposing you have three flounces, one ten, one eight, and one six inches deep at the selvage, the flounce of ten inches wide would take not quite one yard and three-quarters; that of eight inches, one yard, a quarter and three inches; and that of six inches, exactly one yard—making in all four yards for three flounces; this, you will understand, is for flounces cut on the cross or straight in any material you may choose to use. I should advise you to have paper and pencil and your inch measure, and reckon before you purchase your material. Trimmings down the front of a dress, when on the cross, should be cut the same as flounces. In trimming the front of a skirt, it is a good plan to cut a paper the length of the skirt, and pin it on the way you intend to trim, and then tack a tacking-thread by it. Put tackings wherever you mean to trim, before you begin trimming, and lay your skirt on a table to do it; put on all trimmings with a light hand; do not sew them as you would a shirt—it gives them a puckered look. Now mind a good cross, no attempt at making pieces do, unless they are good corner pieces that will join well; you are more sure of making a trimming well, if cut all from one piece. Before cutting a skirt off, that you wish to put tucks in, have a piece of lining or calico at hand, and pin the tucks in it as you wish to put them in your skirt. Supposing you to have pinned your calico exactly like one width of your skirt, take out your pins and measure with an inch measure the exact quantity, and then calculate the exact quantity you will want for the whole skirt. As a general rule, a tucked skirt takes more than a flounced one, and makes less show for the quantity of material used. When running seams of a silk skirt, notch the selvage all the way up the seams of every breadth and pass a moderately warm iron over the seams when finished; seams in a merino skirt require to be run thickly and pressed open; press every join you make in every part of a dress. In gauging a skirt of any kind, gauge the four back widths in larger stitches than you gauge the three front ones; the rule in gauging is to take as much on your needle as you leave; that is, if you took up on your needle a quarter of an inch, you would leave a quarter of an inch; this size would do for the back gathers, but the front must be smaller. All seams should be run with silk the color of the dress. It is a good plan to have fine black thread in your work-box, to sew waists on and gauge the skirts of a dark dress.

Pockets in dresses are a decided objection, and are often worn by ladies because they are put there by the dressmaker, and save any further trouble. A pocket will become loose in a dress, or dirty, and require washing. It pocket-handkerchiefs only were put in, the objection would not be quite so great; so few ladies will wear two, although that is what I could wish. If one pocket must be worn in the dress, wear another as well under the dress. What I should recommend would be to wear two good loose pockets stitched on a band, one on the right, and the other on the left side, eighteen inches long and nine inches wide, made in jean. In this size you

can cut two slits, one across the half of the length, and the other nearer the top, almost at the band. At the entrance to each pocket put a good button and button-hole. A small purse will be more safely carried in the top pocket; button it in, and mind that the button-hole fits the button, or the friction in walking may cause it to unbutton.

On walking out, if you require money, put it loose in your pocket; this may seem objectionable to some, but it certainly is the safest plan. Many ladies like to carry a rather large sum of money; not that they know they shall want it, but in case they may. It certainly is not safe for ladies to look into shop windows, or in any way to loiter with money in their hands, or a watch or jewelry in sight. There is no occasion to do without a watch, but it should not be worn in sight in the street. Ladies will say they like to have it handy, so that they may easily see the time. Thieves and pickpockets quite agree with ladies in carrying every thing handily.

Summer Jackets.—I will now give some hints on the advantages of summer jackets to be worn under the dress, made of thin washing material. The object of these jackets is to preserve the lining of the dress clean, and to protect the dress from the warmth of the neck. I was partly induced to write these hints from having heard a discussion between two young ladies upon the importance of turning a silk dress. It was admitted by both, that the only bad or ugly part of the gown about to be turned was the top of the body. The perspiration and warmth of the neck had certainly taken out the color of the silk half way across the back, from the shoulders upward. Now this must be disheartening, to find a dress spoilt before it is half worn out. During the time of wearing a dress, how much more agreeable it is to see the body-lining nice and clean! To those who wear habit-shirts they are a small protection; but unless they are constantly worn, they will be of little avail. What I propose is this: to wear a small, thin, white jacket, high, made of jaconet or cambric muslin. The thinness or thickness of the material must be regulated by the taste of the wearer. A muslin that requires little or no starch is best. The jackets can be worn either with short or long sleeves, or without any sleeves at all, and to fasten either before or behind, whichever may be preferred. Many young persons merely tack a piece of lace or collar on their dress, and simply put it on over their stays, with nothing to protect the dress. In every way this is a dirty and extravagant habit, for the body must get immensely soiled before the skirt is half worn out. For those to whom expense is no consideration, they can be very prettily trimmed with insertion and lace; but the principal object being cleanliness and protection to the dress, trimming is left entirely to the taste of the wearer. Many ladies wear a low-body petticoat, a thin jacket over, and lastly a habit-shirt. If some persons can wear three articles, and others none at all, there must be something that requires altering in this part of a lady's dress.

GARMENTS, To Renew when Faded and Worn.—To alcohol 1 qt., add extract of logwood $\frac{1}{4}$ lb.; loaf sugar 2 oz.; blue vitriol $\frac{1}{4}$ oz.; heat gently until all are dissolved; bottle for use. To one pint of boiling water put three or four teaspoons of the mixture, and apply it to the garment with a clean brush; wetting the fabric thoroughly;

let dry; then suds out well and dry again to prevent crocking; brush with the nap to give the polish. This may be applied to silks and woolen goods having colors; but is most applicable to gentlemen's apparel.

GREASE SPOTS, To Extract from Linen.—Take magnesia in the lump, wet it and rub it on the spot thoroughly; let it remain an hour or so, and brush it off. Another way is to scrape French chalk upon the spot until it is well covered. Now hold a hot iron near it for a few minutes, and then brush off the chalk. If grease still remains, do it again. French chalk can be had of tailors, who use it in marking cloth for cutting.

GLOVES (Kid), To Color.—1. Put one half ounce extract of logwood into a two ounce phial, and fill up with good brandy. This dye will keep for years, if well corked. Put the gloves on the hand, and with a small swab (a piece of sponge tied to a stick is best), apply the dye evenly all over them. Then rub the one hand with the other, smoothly and firmly, until the gloves are dry—a few minutes only, as the spirit soon evaporates. More logwood gives a nearly black color; less produces a delicate lilac.—2. Dissolve India ink in water, and apply with a camel's hair brush. A fine brown may be obtained by rubbing lightly with a strong decoction of tea.

HATS, To take Care of.—If your hat is wet, shake it out as much as possible; then brush it with a soft brush as smooth as you can, or with a clean linen cloth or handkerchief; wipe it very carefully, keep the beaver flat and smooth, in the same direction as it was first placed; then, with a small cane, beat the nap gently up, and hang it up to dry in a cool place. When it is dry, lay it on a table, and brush it round several times with a soft brush in the proper direction; and you will find your hat not the least injured by the rain. If the gloss is not quite so high as you wish, take a flat iron, moderately heated, and pass the same two or three times gently over the hat; brush it afterwards and it will become nearly as handsome as when sent home from the maker. *To scour a hat when the nap is clotted, and to take salt water out.*—Get a hard brush, a basin of hot water (boiling), and some yellow soap; rub a little of the soap lightly on the brush and dip it into the water; brush the hat round with the nap. If you find the nap clotted, do not scrape it with your fingers, as that tears it off, but brush it until it is smooth, and the soap is thoroughly out; then take a piece of wood, or the back of a knife, and scrape it well round; you will find all the dirt come out; then beat it gently with a cane.

LAUNDRYING, With Carbolie Soap.—Not a few ladies are so situated that they have neither conveniences for washing nor time to go through the usual processes even for the smallest articles, and yet are not in the neighborhood of any person to whom they can trust the doing up of laces and sheer muslins.

We have accidentally discovered how great help in such case is to be found in carbolie soap. A cake of the article as prepared for the toilet being in our soap dish, we one day put into a suds made from it a handful of laces and linen lawns, some of them quite yellow from long waiting, and being busily absorbed, thought no more about them until next day, when they were

found to be entirely whitened and cleansed, and only needing to be rinsed to be ready for the starching.

This knowledge may be made available in the art of doing up nice laces, which any lady may learn if she has the time to attend to it, thus avoiding the necessity of sending them out to be done by those who make the business a profession.

Stretch over a wine bottle, or better, a well cleansed quart stone ink jug, as it is of more uniform diameter, the leg of a soft, firm, fine, white cotton stocking, and secure it well by stitches. On this, wind the collar or band of lace to be cleansed, and then with fine needle and thread baste it carefully on the stocking, following with the needle all the scallops of the edge and catching down all the loops so they cannot get out of place in washing.

Set the bottle in a deep dish or tin pail of carbolie soap suds and let it remain twelve or twenty-four hours as the case may be. Rinse out the suds by holding the bottle under the hydrant or by moving it in a pail of clean water; let it partly drain off and then with a clean sponge or rag or even with the fingers, saturate the lace with a very weak solution of white pulverized, gum arabic in water.

When quite dry, rip off the lace, and if it is not as smooth as is desired, lay it under pressure between the blank leaves of a book, or if there is haste, it may be pressed with a warm flat iron between muslin lined flannels; but the whole process may be performed without any warm water or irons, and several steps in the ordinary mode of washing saved.

The suds may be thrown into the wash bowls to purify the drain pipes.

Whether it is safe to use carbolie soap freely in washing, if the hands must come a good deal in contact with it, is a question.

RIBBON (Velvet), To Iron.—Dampen the under side slightly, and draw it backward and forward over a hot stove pipe until the velvet is quite dry. A still better plan—though in winter it is not always as convenient—is to lay a wet piece of cotton cloth on a hot flat iron placed upside down, and while the steam is rising from it, to draw the under side of the velvet tightly backward and forward over the wet cloth.

SHIRT BOSOMS AND COLLARS, To Starch.—Pour a pint of boiling water upon two ounces of gum arabic, cover it and let it stand over night; in the morning pour it carefully from the dregs into a clean bottle, cork it and keep it for future use. A tablespoonful of this gum arabic water, stirred into a pint of starch made in the usual manner, will give to lawns, either white or printed, a look of newness when nothing else can restore them after they have been washed. To every pint of starch add a piece of butter, lard, tallow or spermaceti candle the size of a chestnut.

SHOE SOLES, To Save.—It consists merely in melting together tallow and common resin, in the proportion of two parts of the former to one of the latter, and applying the preparation hot, to the soles of the boots or shoes—as much of it as the leather will absorb.

SILK, To Keep.—Silk articles should not be kept folded in white paper, as the chloride of lime used in bleaching the paper will probably impair the color of the silk. Brown or blue

paper is better; the yellowish, smooth India paper is the best of all. Silks intended for dress should not be kept long in the house before they are made up, as lying in the folds will have a tendency to impair its durability by causing it to cut or split, particularly if the silk has been thickened by gum. Thread lace veils are very easily cut. But dresses of velvet should not be laid by with any weight above them; if the nap of thin velvet is laid down, it is not possible to raise it up again.

Hard silk should never be wrinkled, because the thread is easily broken in the crease, and it never can be rectified. The way to take the wrinkles out of silk scarfs and handkerchiefs is to moisten the surface evenly with a sponge and some weak glue, and then pin the silk with some toilet pins on a mattress or feather bed, taking pains to draw out the silk as tight as possible. When dry, the wrinkles will have disappeared. The reason of this is obvious to every person. Some silk articles should be moistened with weak glue or gum-water, and the wrinkles ironed out by a hot flat iron on the wrong side.

SILK (Black), To Choose.—When a woman is about to choose black silk, it is well to pull a thread out of the "tram", or filling. She must try the strength of the thread. If it breaks easily, the examination has gone far enough; it is wisdom to look further. We will suppose the thread has been tried and indicates some backbone; then it is necessary, if the woman is right brave, and dares to do such a thing with a handsome pair of clerk's eyes bearing down upon her like a privateer upon a poor little merchantman, to seize the silk by the corner and rub it just as the washerwoman would do when she intends to remove a stain. If this awful ordeal can be performed to perfection—remember some muscle must be brought into play—the silk is honest and legitimate. If it is heavy with dye, if held up to the light, slight traces of disaster may be discerned.

SILK (Black), To "Do up".—Boil an old kid glove (cut into small shreds) in a pint of wa-

ter till the water is reduced to half a pint; then sponge your silk with it; fold it down tight, and ten minutes after iron it on the wrong side while wet. The silk will retain its softness and lustre, and, at the same time, have the "body" of new silk.

WORKING SUIT for Farmers.—Farmers and mechanics need some kind of a substantial working dress—one that is cheaply made and easily put on and comfortably worn. It is very expensive working in a good suit of clothes and exposing them to the various kinds of labor incident to farm life. Put on a pair of new pants and get into an apple tree to trim or graft it, or go to repairing fences, and you will be sure to make a rent in them before they are a day old. Such a thing rarely happens to an old pair. We invented a dress several years since which we have used and recommended to others much to their satisfaction. It is a sleeve vest closed in front, and trowsers in one piece, with only one fastening with a strap behind the neck. The sleeve may be made sufficiently large enough to wear over a coat. The material should be of blue drilling.

Thus at a trifling expense a man can be readily fitted to grapple with any kind of work without a constant fear of tearing or soiling his clothes, while the cost is not one tenth part of a suit of ordinary clothing. It will often be found convenient to wear in hot weather without any other clothing than a shirt. Any clever house-keeper who can make a pair of summer pants, can make one of these most useful articles. The only difficulty usually is not buying cloth enough to have them made sufficiently large. The suit should be large enough to wear over other garments, if necessary, and when the day's work is done it may be removed, others substituted, and the farmer is in complete trim to sit down of an evening dressed in clean clothes and ready to engage in conversation, reading, or any other amusement suited to a rational and intelligent mind. The cost of such a suit is trifling, and is more than made up by what it saves of other clothes.

WASHING, BLEACHING AND DYEING.

ANNOTTO DYE.—Cut the annotto into small pieces, and boil it in a copper, with an equal weight of good pearlash, then dilute with water to a proper color. **Process of Dyeing.**—Immerse the articles, previously rinsed in clean water, in the dye, and give them a good boil; then drain them out and rinse them well in clean water.

Annotto is chiefly used for silks, to which it imparts a fine orange yellow color, the shade of which may be modified, by using different proportions of pearlash, and also by giving the stuff different mordants before putting it into the dye-bath.

BLANKETS, To Clean.—Put two large tablespoonfuls of borax and a pint bowl of soft soap into a tub of cold water. When dissolved, put in a pair of blankets, and let them remain

over night. Next day rub and drain them out, and rinse thoroughly in two waters, and hang them out to dry. Do not wring them.

BLACK DYE.—1. Logwood and cider, with a little water, boiled together in iron, make a good black dye.

2. To one pound of extract of logwood allow an ounce of blue vitriol. Dissolve the logwood in an iron vessel containing five gallons of water, and let it boil. Add to the logwood a table-spoonful of pulverized copperas. Pulverize the vitriol and dissolve it in a separate vessel, containing the same quantity of water; let this also boil. Scald the material first in the vitriol water, and then put it in the logwood; let it remain two hours scalding in the logwood. It should be frequently stirred. This is a good and convenient dye for silks and muslins. They can be

set by washing in a strong lather of home-made soap, and afterward dipped in salt and water. Ink-powder boiled with vinegar will dye black. Copperas is the best thing to set black.

3. Allow a pound of logwood to each pound of goods that are to be dyed. Soak it over night in soft water, then boil it an hour, and strain the water in which it is boiled. For each pound of logwood, dissolve an ounce of blue vitriol in lukewarm water sufficient to wet the goods. Dip the goods in—when saturated with it, turn the whole into the logwood dye. If the goods are cotton, set the vessel on the fire, and let the goods boil ten or fifteen minutes, stirring them constantly to prevent their spotting. Silk and woolen goods should not be boiled in the dye-stuff, but it should be kept at a scalding heat for twenty minutes. Drain the goods without wringing, and hang them in a dry, shady place, where they will have the air. When dry, set the color by putting them into scalding hot water that has salt in it, in the proportion of a teacupful to three gallons of the water. Let the goods remain in till cold; then hang them where they will dry (they should not be wrung). Boiling hot suds is the best thing to set the color of black silk—let it remain in till cold. Soaking black dyed goods in sour milk, is also good to set the color.

BLACK DYE for Cotton.—For 5 lbs. goods—sumac, wood and bark together, 3 lbs.; boil $\frac{1}{2}$ hour, and let the goods steep 12 hours; then dip in lime water $\frac{1}{2}$ hour; then take out the goods and let them drip an hour; now add to the sumac liquor, copperas 8 oz., and dip another hour; then run them through the tub of lime water again for 15 minutes; now make a new dye with logwood, $2\frac{1}{2}$ lbs., by boiling 1 hour, and dip again 3 hours; now add bi-chromate of potash, 2 oz., to the logwood dye, and dip 1 hour. Wash in clear cold water and dry in the shade. You may say this is doing too much. You cannot get a permanent black on cotton with less labor.

BLACK DYE for Wool.—1. For 10 lbs. of wool, bi-chromate of potash, 4 oz.; ground argal, 3 oz.; boil together, and put in the wool; stir well, and let it remain in the dye 4 hours. Then take out the wool, rinse it slightly in clear water; then make a new dye, into which put logwood, $3\frac{1}{2}$ lbs. Boil 1 hour, and add chamber-lye, 1 pt., and let the wool lie in all night. Wash in clear water.

2. For 5 lbs. of goods—blue vitriol, 6 oz.; boil it a few minutes, then dip the goods $\frac{1}{4}$ of an hour, airing often; take out the goods, and make a dye with logwood, 3 lbs.; boil $\frac{1}{2}$ hour; dip $\frac{1}{4}$ of an hour and air the goods, and dip $\frac{1}{4}$ of an hour more. Wash in strong suds.

This will not impart any of its color in fulling, nor fade by exposure to the sun.

BLACK DYE for Straw and Chip Bonnets.

—Chip hats being composed of the shavings of wood, are stained black in various ways. First, by being boiled in strong logwood liquor 3 or 4 hours; they must be often taken out to cool in the air, and now and then a small quantity of green copperas must be added to the liquor, and this continued for several hours. The saucepan or kettle that they are dyed in may remain with the bonnets in it all night; the next morning they must be taken out and dried in the air, and brushed with a soft brush. Lastly, a sponge is dipped in oil, and squeezed almost to dryness;

with this the bonnets are rubbed all over, both inside and out, and then sent to the blockers to be blocked. Others boil them in logwood; and instead of green copperas, use steel filings steeped in vinegar; after which they are finished as above.

BLUE DYE.—Dip in a strong solution of sulphate of indigo, or chemical blue; set with alum. The best way is to boil the articles in strong alum water before dipping them. To color wool blue, boil it in a decoction of logwood, and sulphate or acetate of copper.

BLUE DYE for Wool (Quick Process).—For 2 lbs. of goods—alum 5 oz.; cream of tartar, 3 oz.; boil the goods in this for 1 hour; then throw the goods into warm water, which has more or less of the extract of indigo in it, according to the depth of color desired, and boil again until it suits, adding more of the blue if needed. It is quick and permanent.

BLUE DYE, ANILINE.—To 100 pounds of fabric dissolve $1\frac{1}{2}$ pounds of aniline blue in 3 quarts of hot alcohol; strain through a filter, and add it to a bath of 130° Fah.; also 10 pounds of Glauber's salts, and 5 pounds of acetic acid. Enter the goods, and handle them well for twenty minutes; then heat it slowly to 200° Fah.; then add 5 pounds of sulphuric acid diluted with water. Let the whole boil twenty minutes longer, then rinse and dry. If the aniline be added in two or three proportions during the process of coloring, it will facilitate the evenness of the color. The blue, or red shade of blue, is governed by the kind of aniline used, as there is a variety in the market. Hard and close weave fabrics, such as braid, ought to be prepared in a boiling solution of 10 pounds of sulphuric acid and 2 pounds of tartaric acid before coloring with the aniline, as this will make the fabric more susceptible to the color. Blues soluble in water color more easily than those which have to be dissolved in alcohol.

BLUE, CHROME.—100 pounds of wool are boiled for 1 hour in a solution of 3 pounds of bichromate of potash, 6 pounds of alum, 1 pound of half-refined tartar: then it is taken out, cooled, and rinsed. Boil 6 pounds of good logwood in a bag for half an hour in fresh water, add 3 pounds of cudbear, well moistened and dissolved. Cool the dye to 180° Fah. Enter the prepared wool, and handle it for three quarters of an hour; bring it to a boil in this time. This color ought to be always left a shade lighter when finished, as all chrome colors darken in drying.

BLUE DYE, DARK (Suitable for Thibets and Lastings).—Boil 100 pounds of the fabric for one hour and a half in a solution of 25 pounds of alum, 4 pounds of tartar, 6 pounds of mordant, 6 pounds of common extract of indigo; cool them as usual. Boil in fresh water from 8 to 10 pounds of logwood, in a bag or otherwise, then cool the dye to 170° Fah. Reel the fabric quickly at first, then let it boil strongly for one hour. This is a very good imitation of indigo blue. Chemic can be used in the preparation; but should the shade require more of the indigo while finishing in the logwood, extract of indigo ought to be used.

The old English way of coloring a blue black on lastings, is by boiling 100 pounds of the fabric for one and a half hours in a solution of 10 pounds of alum, 1 pound of copperas, and 1 pound of blue vitriol; take the goods out, cool

them, and boil them for one hour in a dye containing 10 pounds of logwood. This color would not look well on soft goods, such as thibets, as in fact it is only a dark slate, but it looks better on lastings, on account of its gloss.

N. B.—To all these colors the logwood can be boiled in large quantities, say a barrelful in a hoghead of water at a time, 2 pounds of logwood being reckoned to a pail of liquid. This will save boiling the chips in a bag. Five pails will be equal to 10 pounds of chips. It has this advantage, too: more can be easily added if the shade require darkening. Extract of logwood should never be used for blues, as it will produce dull colors on account of its being disoxidized by time.

BLUE DYE, DARK (Topped with Logwood).—Give it a dip first in the blue vat, then rinse; then boil the wool for one hour in a kettle containing 10 pounds of alum, 2 pounds of half-refined tartar, and $1\frac{1}{2}$ pounds of blue vitriol; after which take it out, cool, and make fresh water. Add from 5 to 10 pounds of logwood, according to the shade required, and the quality of the logwood; let it boil in a bag or otherwise, cool the kettle to 170° Fah., enter the wool and handle slowly; in one hour it can be cooled, rinsed, and switched for drying. This does not require any alkali in shading the wool, as the soap will do this in fulling. If cloth be colored this blue, some pearlash or urine may be used to accomplish it; but then the kettle ought to be cooled to 136° Fah. The goods require good scouring, otherwise they will crock.

BLUE DYE, DARK (For Broadcloth in the Wool).—This is colored in a healthy wood vat; the first dip is handled well and slow for one hour in the net, then taken out, aired, and the vat stirred again; in two hours it can be dipped again for half an hour, and so often taken through until it has acquired the right shade. The vat ought to be strong enough in indigo to color it dark enough in three dips. About 10 pounds of good indigo is reckoned to 100 pounds of wool; clear indigo blue does not require anything more, but if taken through a warm bath containing two pounds of blue vitriol, the color stands better in fulling, and is faster; after which it is rinsed, switched, and dried. The dark blue generally found in the market is topped with 15 pounds of camwood or 20 pounds of red sanders; the latter are boiled on the colored wool, as the indigo required for such dark colors would make it very expensive.

BLUE DYE, INDIGO, for cloth (PART LOGWOOD).—100 pounds of cloth. Color the cloth first by one or more dips in the vat of indigo blue, and rinse it well; then boil it in a solution of 20 pounds of alum, 2 pounds of half-refined tartar, and 5 pounds of mordant for two hours; then take it out and cool. In fresh water boil 10 pounds of good logwood for half an hour in a bag or otherwise; cool off the kettle to 170° Fah. before entering; handle well over a reel; let it boil for half an hour, then take it out, cool, and rinse. This is a very fine blue, but not so permanent for wear.

BLUE DYE, INDIGO (For Hosiery).—100 pounds of wool are colored with 4 pounds of Guatemala or 3 pounds of Bengal indigo, in the wood or soda vat; then boil in a kettle a few minutes 5 pounds of cudbear or 8 pounds of chil paste; add one pound of soda, or, better,

one pail of urine; then cool the dye to about 170° Fah., and enter the wool. Handle well for about twenty minutes; take it out, and cool, rinse, and dry. It is all the same if the cudbear be put in before or after the indigo. Three ounces of aniline purple dissolved in one half pint of alcohol can be used instead of the cudbear. It produces a very pretty shade, but it ought never to be used for mixed goods, which have to be bleached, as it runs into the white; also the cudbear disappears in the sulphur.

BLUE, LIQUID.—1. Take 1 ounce of soft Prussian blue, powder it and put in a bottle with 1 quart of clear rain water, and add a quarter ounce of oxalic acid. A teaspoonful is sufficient for a large washing.

2. Take half a pound of best double oil of vitriol, mix one ounce of Spanish indigo, pounded very fine, and scrape in a little chalk; have an iron pot half full of sand, set this on the fire; when the sand is hot, put the bottle in, and let the vitriol, etc., boil gently for a quarter of an hour, take the whole off the fire, and let it stand for twenty-four hours, and then bottle it for use.

3. Put into a small mattress or common vial 1 oz. of pure Prussian blue reduced to powder, and pour over it from $1\frac{1}{2}$ oz. to 2 oz. of concentrated muriatic acid. The mixture produces an effervescence and the prussiate soon assumes the consistence of thin paste. Leave it in this state for 24 hours, then dilute it with 8 or 9 oz. of water, and preserve the color thus diluted in a bottle well stoppered.

The intensity of this color may be lessened, if necessary, by new doses of water. If the whole of this mixture be poured into 1 quart of water, it will still exhibit a color sufficiently dark for washing prints.

BLUE DYE, LOGWOOD.—To 100 pounds of cloth or wool dissolve 15 pounds of alum, 2 pounds of half-refined tartar, and 3 pounds of blue vitriol; enter the fabric, and let it boil for one hour; take it out, cool as usual. Then boil in fresh water for twenty minutes 10 pounds of good logwood in a bag or otherwise, cool the dye to 170° Fah., and enter the fabric. Handle it well for half an hour, during which time raise the heat nearly to boiling, then take it out and cool; cool the dye to 136° Fah.; add 5 pounds of pearlash, or 4 pails of urine. Enter the goods again, and handle for half an hour, when they will be a fine blue. Soda ought never to be used, as it makes a dull color. Rinse and dry. This color is suitable for blue-mixed hosiery.

BLUE, PRUSSIAN.—Prussiate of potash was formerly only used on cotton, with a preparation of iron first; and, about the year 1828, was first used on woolens, and, of course, no one then thought that they could be colored without giving the fabric a preparation of iron, before entering into the prussiate of potash solution. Every dyer had his preference to one or the other solutions of iron; they were nitro-muriate of iron, acetate, and tartrate of iron. Some used iron oxide (burnt copperas) dissolved in sulphuric acid, etc.; but later, the yellow prussiate was only used until the introduction of the red prussiate of potash. The latter has the preference, as it can be added, for darkening the shade, while in the process of coloring, which is not the case with the yellow prussiate of potash; but this would rot the cloth, as this color requires a large quantity of acid. To 100 pounds of wool

or flannel dissolve 8 pounds of red prussiate of potash, 2 pounds of tartaric acid, 2 pounds of oxalic acid, 5 pounds sulphuric acid. Handle the fabrics in this for half an hour at 120° Fah.; then reel the goods out, and heat to about 165° Fah.; add 5 pounds of sulphuric acid, and 1½ pounds of tin crystals; stir all well; enter the goods, and handle for half an hour longer; then heat it to 208° Fah., when it will be a good blue. The shade can be varied to any extent by the addition of logwood liquor and a few pounds of scarlet spirit; but the liquid ought to be cooled first, and the goods handled quickly to secure evenness while in the logwood. This color ought never to boil, especially when coloring with steam, as more than boiling heat (212°) destroys the color and makes it lighter; but letting the fabrics lay a few hours exposed to the oxygen before rinsing is an improvement to the color. This color must be well washed or else it will smut. This blue will be brighter if aniline purple be used for darkening, instead of logwood; but this ought to be done after the goods have been washed, and in fresh water. If a mordant of 10 pounds nitric acid, 36° B., 10 pounds muriatic acid, 22° B., 10 pounds sulphuric acid, 66° B., diluted with water, and 1 pound feathered tin added, be used, instead of sulphuric acid, the color will be fast.

BLUE DYE, PRUSSIAN (For Cotton).—

1. Clean the cloth or goods by steeping in soap-suds, then rinse in several different messes of clean water, and lay aside moist.

2. Into a clean iron, stoneware, or wooden vessel put the amount of clean warm water deemed necessary to work the cloth or goods in easily, and add the solution of perntrate of iron, and mix well by stirring with a wooden rod; after which put in the still moist cloth or goods, and work them forty-five minutes or longer, and let them lie in till the next bath is ready.

3. Into another clean stoneware, iron or wooden vessel put the amount of clean warm water deemed necessary to work the goods in easily, and add the prussiate of potash (previously dissolved in a little hot water in a basin or kettle), and also the oil of vitriol, and mix well by stirring with a clean, wooden rod; then wring out the goods evenly from the perntrate of iron bath, and work them in this prussiate of potash bath twenty minutes; after which wring out and work again a few minutes in the perntrate of iron bath; then wring out, rinse in several different messes of clean water, and dry in the shade.

If the color of the goods should not be dark enough after one round of dippings, repeat in the order above described, till the shade suits. The whole of the goods need not be dried after each round of dippings for the purpose of examining the color. Dry one end of the goods, or a small piece. A handsomer shade of blue can be obtained, if the expense can be afforded, by adding to the perntrate of iron bath two ounces by weight of solution of protochloride of tin for each pound of goods to be dyed. Strong vinegar can be used in the prussiate of potash bath in place of oil of vitriol, but the blue color will not be so handsome. If vinegar is used, three or four pints should be added to the prussiate of potash bath for each pound of goods, and a portion of the water equal to the vinegar should be omitted.

A single pound of cotton goods requires about four gallons of water in each bath to work it in

easily. Larger quantities of these goods do not need quite so much water in proportion.

The utensils used with this dye should be cleaned first with potash lye, then with water, afterwards with hot vinegar, and lastly with clean water.

The use of brass or copper vessels in this dye is to be avoided.

BLUE, PURPLE.—A curious purple was very fashionable about twenty-five years ago. 100 pounds of wool were first dipped a light blue in the vat, and well rinsed. Then take a stone pot, put in 3 pounds of half-refined tartar, 3 pounds of feathered tin, 5 pounds of blue vitriol, and 20 pounds of muriatic acid; heat all in a sand bath until dissolved.

From this mordant take 10 pounds in a suitable kettle; add 5 pounds half-refined tartar to it, stir it well, and enter the wool at 170° Fah.; let it boil for one hour; take it out, cool, and let it lay for twenty-four hours. Then boil out 20 pounds of good logwood for three quarters of an hour in fresh water; cool off the kettle to 150° Fah., enter the wool, and handle it well for half an hour, then heat it up to 185° Fah., but let it not boil; let it go for one hour more, when it will be a dark purple. This color stands the sun remarkably well, perhaps owing to the fact that there is not any alum or sulphuric acid used, except that contained in the blue vitriol.

BLUE, PURPLE (Fast Color).—100 pounds of wool are first dipped in the blue vat to a light shade, then boiled in a solution of 15 pounds of alum and 3 pounds of half-refined tartar, for one hour and a half; the wool taken out, cooled, and let stand twenty-four hours. Then boil in fresh water 8 pounds of powdered cochineal for a few minutes; cool the kettle to 170° Fah.; handle the prepared wool in this for one hour, in which time let it boil for three quarters of an hour, when it is ready to cool, rinse, and dry. By coloring first with cochineal, as aforesaid, and finishing in the blue vat, the fast purple or dahlia, so much admired in German broadcloths, will be produced. Tin acids must not be used in this color.

BLUE, SAXON.—100 pounds of thibet or comb yarn, 20 pounds of alum, 3 pounds of cream of tartar, 2 pounds of mordant, 3 pounds of extract of indigo, or 1 pound of carmine instead; the latter makes a better color. When all is dissolved, cool the kettle to 180° Fah.; enter and handle quickly at first, then let it boil half an hour, or until even. If the fabric be not scoured clean, it will look shady; and about 5 pounds of common salt added will remedy this. Remember, long boiling dims the color. Zephyr worsted yarn ought to be prepared first by boiling it in a solution of alum and sulphuric acid, then the indigo added afterwards. For common coarse carpet yarn, it is only necessary to handle it through a hot dye of 175° Fah., containing 15 pounds of alum, 10 pounds of sulphuric acid, 4 pounds of chemic paste, to 100 pounds of yarn, or through its equivalent of extract of indigo. If chemic be used, the dye ought not to come to a boil, otherwise the impurities of the indigo will color the yarn and dull its brilliancy. Rinse well in water before drying. The tin acid fastens the color somewhat. It will not fade so easily, nor run into the white, if wove into flannels, which have to be scoured in soap, and bleached. The color changes in the sulphur house into a stone

green shade, but the original color comes back again when the fabric is rinsed again in water.

BLUE (SKY) DYE for Cotton.—For 3 lbs. goods—blue vitriol 4 oz.; boil a few minutes; then dip the goods 3 hours, after which pass them through strong lime water. You can make this color a beautiful brown by putting the goods through a solution of prussiate of potash.

BLEACHING.—The operation by which the natural colors of substances are discharged, and they become white or colorless. Bleaching may be performed either by natural means, as exposure to light, air, and moisture, or by chemical agents, as chlorine, chloride of lime, sulphurous acid, etc. In many of the processes adopted for this purpose, both methods are combined.

BLEACHING COTTON.—Cotton, from its original whiteness, and little attraction for coloring matter, is more easily bleached than most other substances. On the old plan, it is first well washed in warm water to remove the weaver's paste or dressing, then "bucked" (boiled) in a weak alkaline lye, and after being well washed is spread out upon the grass, or bleaching ground, and freely exposed to the joint action of light, air, and moisture. The operation of "bucking" and exposure is repeated as often as necessary, when the goods are "sour" or immersed in water acidulated with sulphuric acid, after which they receive a thorough washing in clean water, and are dried. From the length of the exposure upon the bleaching ground, this method has been found to injure the texture of the cloth, and from the number of operations required, necessarily becomes expensive, and produces considerable delay; it has therefore very generally given place to the improved system of chemical bleaching, by means of chloride of lime. In this method, after the first operation of washing and bucking, as in the common process, the cotton is submitted to the action of weak solutions of chloride of lime, and afterwards passed through soured water, when it has only to be thoroughly washed and dried.

BLEACHING LINEN.—Linen is bleached in a similar way to cotton, but the operation is more troublesome, from its greater affinity for coloring matter.

BLEACHING WOOL.—Wool is first exposed to the joint action of fuller's earth and soap, in the fulling mill, to remove adherent grease and dirt, and is then well washed and dried, when it is usually found sufficiently white for the purposes of the dyer; but should the slight yellow tint it retains prove objectionable, it is run through water tinged blue with indigo, or it is exposed to the fumes of burning sulphur; the latter method gives it a harsh feel, which is best removed by a bath of soap and water, but this will reproduce its previous yellowness.

BLEACHING SILK.—Silk is bleached by boiling it in white soap and water, to remove the natural yellow varnish that covers it, after which it is subjected to repeated rinsings. Articles that are required to be very white, as gloves, stockings, etc., are also submitted to the action of sulphurous acid, or the fumes of burning sulphur.

BLUE and PURPLE DYE for Stocking Yarn.—For 5 lbs. of wool, bichromate of potash 1 oz.; alum 2 oz.; dissolve them and bring the water to a boil, putting in the wool and boiling 1 hour; then throw away the dye and make another dye with logwood chips 1 lb., or extract of

logwood 2½ oz., and boil 1 hour. This also works very prettily on silk.

Whenever you make a dye with logwood chips, either boil the chips ½ hour and pour off the dye, or tie up the chips in a bag and boil with the wool or other goods, or take 2½ oz. of the extract in place of 1 lb. of the chips is less trouble and generally the better plan. In the above recipe the more logwood that is used the darker will be the shade.

BORAX, Virtues of.—It may not be generally known how very valuable borax is in various purposes of household use. We find it the very best cockroach exterminator yet discovered. One half pound costing but fifty cents, has completely cleared a large house formerly swarming with them, so that the appearance of one in a month is quite a novelty. The various exterminating powders puffed and advertised have been found not fully effective, tending rather to make the roaches crazy than to kill them. There is something peculiar, either in the smell or touch of borax, which is certain death to them. They will flee in terror from it, and never appear again where it has once been placed. It is also a great advantage that borax is perfectly harmless to human beings, hence no danger from poisoning. It is also valuable for laundry purposes.

The washerwomen of Holland and Belgium, so proverbially clean, and who get their linen so beautifully white, use refined borax as washing-powder, instead of soda, in the proportion of a large handful of borax powder to ten gallons of water. They save soap nearly one-half. All the large washing establishments adopt the same mode. For laces, cambrics, etc., an extra quantity of the powder is used; and for crinolines (requiring to be made stiff) a stronger solution is necessary. Borax, being a neutral salt, does not in the slightest degree injure the texture of linen. Its effect is to soften the hardest water, and therefore it should be kept on the toilet table. As a way of cleansing the hair, nothing is better than a solution of borax in water. It leaves the scalp in a most cleanly condition, and the hair is just sufficiently stiffened to retain its place. This stiffness, however, can be readily removed, if objectionable, by washing with water. Borax is also an excellent dentifrice; dissolved in water, it is one of the best tooth-washes. In hot countries it is used, in combination with tartaric acid and bicarbonate of soda, as a cooling beverage.

BROADCLOTH, To Remove Stains from.—Take an ounce of pipe-clay, that has been ground fine, and mix it with twelve drops of alcohol, and the same quantity of spirits of turpentine. Whenever you wish to remove any stains from cloth, moisten a little of this mixture with alcohol, and rub it on the spots. Let it remain till dry, then rub it off with a woollen cloth, and the spots will disappear.

BROWN DYE.—The different shades of this dye vary from pale yellow and reddish brown, up to very dark brown, almost black, every shade of which, however, may be produced as the taste of the workman may dictate, by mixtures of reds and yellows with blues and blacks, or by simple dyes, which at once impart a brown, as catechu, walnut rinds, or oxide of manganese.

BROWN DYE for Wool.—1. Boil the cloth in a mordant of alum and common salt dissolved in water, then dye it in a bath of logwood, to which a little green copperas has been added.

The proportion of alum should be 2 oz., and of salt, 1 oz., to every pound of cloth.

2. Boil the goods in a mordant of alum and sulphate of iron, then wince them through a bath of madder. *Remarks.* The tint depends on the relative proportions of the alum and copperas; the more of the latter, the darker will be the dye. The joint weight of the two should not exceed $\frac{1}{4}$ of the weight of the wool. The best proportions are 2 parts of alum and 3 of copperas.

3. Give the wool a mordant of alum and tartar, then pass it through a madder bath, which will dye it red. It must now be run through a black bath of galls and sumach, or logwood, to which a little acetate or sulphate of iron has been added.

4. Proceed to mordant the cloth as last, and dye in a madder bath, then remove it and add a little acetate or sulphate of iron, and again pass it through the bath, until the required tint is produced.

5. Give the cloth a light blue ground with indigo, then give it a mordant with alum, wash in water, and run it through a bath of madder.

6. Give the cloth a mordant of alum and tartar, then pass it through a madder bath, and afterwards through a bath of weld or fustic, to which a little iron liquor has been previously added. In this way every shade from mordoré and cinnamon to dark chestnut may be dyed.

7. Boil 1 lb. of fustic chips for 2 hours, and pass the cloth through the bath for 1 hour, take it out and drain, then add $1\frac{1}{4}$ oz. of green copperas, and $\frac{1}{4}$ lb. of good madder, and pass the cloth again through the bath, until the proper tint is produced. This makes bronze browns, but by varying the proportion of the mordant, other shades may be produced.

BROWN DYE, for Silk.—1. Give the silk a mordant as before described, then dye in a bath made by mixing the equal parts of decoction of logwood, fustic, and Brazil wood. The shade may be varied by mixing the decoctions in different proportions. Brazil wood reddening, logwood darkening, and fustic yellowing, the tint.

2. Dissolve 4 oz. of annatto and 1 lb. of pearl-ash in boiling water, and pass the silk through it for 2 hours, then take it out, squeeze it well and dry; next give it a mordant of alum, and pass it first through a bath of Brazil wood, and afterwards through a bath of logwood, to which a little green copperas has been added; wring it out and dry; afterwards rinse well.

BROWN DYE, for Cotton and Linen.—1. Give the pieces a mixed mordant of acetate of alumina and acetate of iron, and then dye them in a bath of madder, or madder and fustic. When the acetate of alumina predominates, the dye has an amaranth tint. The iron darkens it.

2. First gall the goods, then turn them for a short time through a black bath, next give them a mordant of sulphate of copper, and pass them through a decoction of fustic, afterwards through a bath of madder, and again through the solution of sulphate of copper; drain, dry, and rinse well, then finish with a boil in soap and water. This gives a chestnut brown.

3. First give a mordant of alum, then pass the goods through a madder bath, and next through a bath of fustic, to which a little green copperas has been added. This gives a cinnamon brown.

BROWN DYES, DIRECT.—Browns may

be also dyed at once, by what are called substantive or direct dyes; thus—

1. *Decoction of oak bark* dyes wool a fast brown of various shades, according to the quantity employed. If the cloth be first passed through a mordant of alum, the color is brightened.

2. *Infusion or decoction of walnut peels* dyes wool and silk a brown, which, like the preceding, is brightened by alum. The older the liquor the better.

3. *Horse-chestnut peels* also give a brown. A mordant of muriate of tin turns it on the bronze, and sugar of lead the reddish brown.

4. *Catechu, or terra japonica*, gives cotton a brown dye; blue vitriol turns it on the bronze, green copperas darkens it, when applied as a mordant, and the stuff dyed in the bath boiling hot. Acetate of alumina as a mordant brightens it. The French color, called "carmelite," is given with 1 lb. of catechu, 4 oz. of verdigris, and 5 oz. of sal ammoniac.

5. *Sulphate or muriate of manganese*, dissolved in water with a little tartaric acid, gives the bronze tint called "solitaire." The stuff after being passed through the solution, must be turned through a weak lye of potash, and afterwards through another of chloride of lime, to brighten and fix it.

6. *Prussiate of copper* gives a bronze or yellowish-brown to silk. The piece well mordanted with blue vitriol, may be passed through a solution of prussiate of potash.

BROWN DYE, CHEAP.—The following is a good dye for coloring brown, composed of materials easily procurable in the woods: Take the bark of the common alder, boil it an hour; having sufficient water to cover the goods; add a very little copperas; dip in the articles to be colored; let them remain about ten minutes; wring them out, and then dip them into a very weak lye—previously prepared—wring them out immediately, and wash them in soap and soft water.

BUFF DYE, on Cotton.—Take as much hot fustic liquor and water, as will half fill a tub, enter three pieces, give them five ends, hedge out, take another tub of cold lime water, enter the same pieces, and give them five ends in this, take out, and in a short time they will be buff. Renew your first and second tub, and proceed as at first. This is all required for buff.

CALICOES, To Wash.—Black calicoes should be washed in water in which potatoes have been boiled, or starch water made by having two or three potatoes scraped in it; or pour boiling water on wheat bran, strain it, and when lukewarm wash them in it, using no soap. Before wetting any calico, rub soap on the crease spots—hard soap, or soft soap a year old. Alum is good to set the color of green; salt put in the rinsing water of blue, black or green calico, will prevent the colors running into each other. Some washerwomen infuse eight gills of salt in four quarts of boiling water, and put the calicoes in while hot, leaving them until cold, which process is to render the colors permanent, so they will not fade by subsequent washing. Cotton goods (except pure white) should never remain in water a moment longer than necessary, and should be dried in the shade.

CARPET WARP, Coloring for.—Extract of hemlock bark is the substance required. Wet

the warp thoroughly with lime water, then boil in a strong liquor made by dissolving extract of hemlock bark in water. Use a brass, copper, or porcelain kettle (not iron or tin); this gives a tan color. For a black color use strong copperas water in place of lime water. Iron or tin vessels will answer when copperas is used. A slate color can be made by using a small quantity of the copperas water and extract liquor to a large quantity of the warp. A brown color can be made by using only a small portion of copperas with the extract. The shades of color can be changed by varying the amount and proportion of the coloring materials. A little care will enable any one to make desirable colors with these materials, and to modify the colors by using other substances with them. The extract of hemlock bark is very extensively used by tanners for making leather, and is made at large establishments for the purpose located in or near the hemlock forests.

CHINTZ, To Wash.—Take 2 lbs. of rice, boil it in 2 galls. of water till soft; then pour the whole into a tub; let it stand till about the warmth in general used for colored linens; then put the chintz in, and use the rice instead of soap; wash it in this till the dirt appears to be out, then boil the same quantity as above, but strain the rice from the water, and mix it in warm clear water. Wash in this till quite clean; afterwards rinse it in the water which the rice has been boiled in, and this will answer the end of starch, and no dew will affect it. If a gown it must be taken to pieces, and when dried be careful to hang it as smooth as possible; after it is dry rub it with a sleek stone, but use no iron.

CHROME ORANGE DYE, for White Cotton Goods.—1. Clean the cloth or goods by steeping in soap-suds, then rinse in several different messes of clean water, and lay aside moist.

2. Put the litharge and acetate of lead into a brass or copper kettle, with only one fourth part of the water that will afterwards be required to dye the cloth or goods in, and boil together thirty minutes or longer, stirring often with a wooden rod; then add hot water till the amount is reached that is needed to work the cloth or goods in easily, and stir till thoroughly mixed, after which put in the still moist cloth or goods, and let them remain at a blood-heat thirty minutes or longer, stirring often.

3. Put the bichromate of potash and sal soda into a brass, copper, or iron kettle, with only one-fourth part of the water that will afterwards be needed to dye the cloth or goods in, and boil together at a full wallop thirty minutes or longer; then add hot water till the amount is reached that is required to work the goods in easily, after which wring out the goods evenly from the acetate of lead bath, and work them in this chromate of potash and soda bath, at a blood-heat, from fifteen to thirty minutes, or until the goods take on an even and full orange color; then remove from the bath, rinse in several different messes of clean water, and dry, in the shade or in sunshine.

If the color on the goods is not even, or not dark enough, after they have been steeped once in each bath, repeat the steepings or workings in both baths in the order above described. In every repetition of these steepings, should any repetition be necessary, a little fresh sal soda should be procured and added to the chromate of

potash and soda bath, and the whole should be well boiled before introducing the cloth or goods.

A single pound of cotton cloth or goods requires about four gallons of water in each kettle or bath to work it in easily when dyeing. Larger quantities of these goods do not need quite so much water in proportion.

Kettles or utensils that have been used with this dye may be cleaned, first with water, then with warm or hot potash-lye, and lastly with clean water.

DYE-STUFFS needed for one pound of Goods.—Two ounces of litharge in a paper by itself, S.: Litharge for chrome orange. One and a half ounces of acetate of lead in a paper by itself, S.: Acetate of lead for chrome orange. One and a half ounces of sal soda in a paper by itself, S.: Sal soda for chrome orange. One and a quarter ounces of bichromate of potash in a paper by itself, S.: Bichromate of potash for chrome orange. All of these articles should be very accurately weighed. As customers rarely or never possess scales and weights with which they can accurately divide parcels of dye-stuffs, nor kettles in which they can dye more than three pounds of goods at one time with this color, it will be best to put up these dye-stuffs in sets for three pounds of goods, or less. For instance, should a customer wish chrome orange dyes for five pounds of goods, it would be advisable to put up one set of dyes for three pounds of goods, and another set for two pounds. Each set, in such a case, should be put in a wrapper by itself, and labeled, respectively, "Chrome orange dyes for three pounds of goods," and "Chrome orange dyes for two pounds of goods."

To save time, the litharge and acetate of lead can sometimes be both put into one package, with the name of each article written upon it; but the bichromate of potash and sal soda must each be put into a paper by itself. Bichromate of potash and sal soda react upon one another when mixed if either salt is damp, and produce a deliquescent salt that soon destroys the paper wrapper.

CINNAMON BROWN AND COFFEE BROWN DYES, for Cotton.—1. Clean the cloth or goods by steeping in soap-suds, then rinse in several different messes of clean water, and lay aside moist. The preliminary washing just described will be sufficient for old or worn goods; but new cloth or yarn, or carpet-warp, which almost always contain more or less oil from the spinning, must be cleaned in a bath made by dissolving a half ounce of hard soap and a half ounce of sal soda in each gallon of water needed for the steeping or washing. After the goods have been thus cleaned, they are to be well rinsed in clean water, and laid aside moist.

2. Steep the catechu and blue vitriol, from one to two hours, in a brass or copper kettle, with the amount of clean water deemed necessary to work the cloth or goods in easily, stirring often with a wooden rod; then put in the still moist cloth or goods, and steep at a scalding heat from five to ten hours, or until the goods take on an even, cinnamon brown color. The goods are to be stirred frequently during this steeping, and hot water is to be added to the kettle from time to time, to compensate for loss by steam. After the goods have taken on a cinnamon brown color, remove them from the bath, rinse in several

different messes of clean water, and lay aside moist.

3. Dissolve the bichromate of potash, by heat, in a brass, copper, or iron kettle, with the amount of clean water deemed necessary to work the cloth or goods in easily; then put in the still moist cloth or goods, and steep at a scalding heat one hour or longer, or until the goods take on a coffee brown color; after which remove from the bath, rinse in several different messes of clean water, and dry in the shade.

If the color on the goods should not be dark enough, after they have been steeped once in each bath, repeat the steepings in both baths, in the order above directed, till the shade suits; then rinse in several different messes of clean water, and dry in the shade.

If the goods should not take on any color after steeped from one to two hours in the catechu bath, it may be concluded that they still contain grease or oil. In such a case the goods must be lifted from the bath, drained well, rinsed in clean water, and then steeped in a fresh bath of soap and sal soda; after which they are to be rinsed in clean water, and then returned to the catechu bath, and steeped again.

When only a cinnamon brown color is desired, the steeping in the bichromate of potash bath may be omitted, and the goods may be rinsed and dried from the catechu bath. If a coffee brown color is desired, druggists must be requested to put up the appropriate quantity of bichromate of potash, as without this request, in each case, druggists do not put up that article.

A single pound of cotton goods requires about four gallons of water in each bath to work it in easily, when dyeing; larger quantities of these goods do not need quite so much water in proportion.

Dye Stuffs needed for one Pound of Goods.—Two ounces of dark-colored catechu (or cutch) in a paper by itself, *S. Catechu for brown on cotton.* One-fourth ounce of blue vitriol in a paper by itself, *S. Blue vitriol for brown on cotton.* When a coffee brown dye is desired, put up, in a paper by itself, a half ounce of bichromate of potash, *S. Bichromate of potash for brown on cotton.* For three pounds of goods, coffee brown shade, put up only one ounce of bichromate of potash, and for all quantities of goods above three pounds, put up only a third of an ounce of that salt for each pound. Time can be saved when dyeing these browns by making the catechu bath stronger than here directed, and if customers wish to shorten the processes, put up three or even four ounces of dark catechu for each pound of goods. One-eighth of an ounce of blue vitriol must be put up for each ounce of catechu that is taken.

CLOTH, Cleaning and Scouring of.—The common method of cleaning cloth is by beating and brushing, unless when very dirty, when it undergoes the operation of scouring. This is best done on the small scale, as for articles of wearing apparel, etc., by dissolving a little curd soap in water, and, after mixing it with a little oxgall, to touch over all the spots of grease, dirt, etc., with it, and to rub them well with a stiff brush until they are removed, after which the article may be well rubbed all over with a brush or sponge dipped into some warm water, to which the previous mixture and a little more oxgall has been added. When this has been pro-

perly done, it only remains to thoroughly rinse the article in clean water until the latter passes off uncolored, when it must be hung up to dry. For dark-colored cloths the common practice is to add some fuller's earth to the mixture of soap and gall. When nearly dry, the nap should be laid right, and the article carefully pressed, after which a brush, moistened with a drop or two of olive oil, should be several times passed over it, which will give it a superior finish. Cloth may also be cleaned in the dry way as follows:—First, remove the spots as above, and, when the parts have dried, strew clean damp sand over it, and beat it in with a brush, after which brush the article with a hard brush, when the sand will readily come out, and bring the dirt with it. Black cloth which is very rusty, should receive a coat of revive after drying, and be hung up until the next day, when it may be pressed and finished off as before. Scarlet cloth requires considerable caution. After being thoroughly rinsed, it should be repeatedly passed through cold spring water, to which a tablespoonful or two of solution of tin has been added. If much faded, it should be dipped in a scarlet dye-bath. Buff cloth is generally cleaned by covering it with a paste made with pipe-clay and water, which, when dry, is rubbed and brushed off.

CLOTH, To Raise the NAP on.—Soak in cold water for $\frac{1}{2}$ an hour, then put on a board, and rub the thread-bare parts with a half-worn hatter's card, filled with flocks, or with a prickly thistle, until a nap is raised. Hang up to dry, and with a hard brush lay the nap the right way.

CLOTHS, Fuller's Purifier for.—Dry, pulverize, and sift the following ingredients:

Six lbs. of fuller's earth, 1 lb. of pipe clay, and 4 oz. of French chalk.

Make a paste of the above with the following: One oz. of rectified oil of turpentine, 2 oz. of spirit of wine, and $1\frac{1}{2}$ lbs. of melted oil soap.

Make up the compound into six-penny or shilling cakes for sale. These cakes are to be kept in water, or in small wooden boxes.

CLOTHES (Black), To clean.—Clean the garments well, then boil four ounces of logwood in a boiler or copper containing two or three gallons of water, for half an hour. Dip the clothes in warm water, and squeeze dry; then put them into the copper and boil for half an hour. Take them out, and add three drachms of sulphate of iron; boil for half an hour, then take them out, and hang them up for an hour or two; take them down, rinse them in three cold waters, dry well and rub with a soft brush which has had a few drops of olive oil rubbed on its surface. If the clothes are threadbare about the elbows, cuffs, etc., raise the nap with a teazel or half worn hatter's card, filled with flocks, and when sufficiently raised, lay the nap the right way with a hard brush. We have seen our old coats come out with a wonderful dash of respectability after this operation.

CLOTHS (Black), To Revive when Faded.—Boil three ounces of logwood in a quart of vinegar, and when the color is extracted, drop in a piece of carbonate iron the size of a large chestnut; let it boil five minutes. Have the articles to be restored well sponged with soap and hot water, lying them on the table, and brush the nap down with a sponge. Then take the dye upon the table and sponge them all over with it, tak-

ing care to keep them smooth, and brush downward.

When completely wet with the dye, dissolve a teaspoonful of saleratus in a teacup of warm water, and sponge over again with this, which sets the color so completely that nothing rubs off. They must not be wrung or wrinkled but carefully hung up to drain. The brownest cloth may be made a perfect black in this simple manner. So many people have faded garments that this recipe may be of service in restoring them to a lively color.

CLOTHS, A Liquid to Extract Grease from.—Take one peck of lime; add thereto as much water as will dissolve the lime and leave about two gallons of clear water after it has been well stirred and settled. Let it stand about two hours, and then pour off the clear liquid into another vessel. Now add to it three ounces of pearlash for every gallon of the liquid, stir it well, and, when settled, bottle it for use. This liquor is to be diluted with water, to suit the strength or delicacy of the color of the cloth. It is applied with a piece of coarse sponge, rubbing out the grease, and applying clear water afterwards.

COUNTERPANES (White) and CALICO QUILTS, To Wash.—Wash them in the same way as blankets, only with hard soap, and rinse them in cold water. If convenient, it is the best way to take them to a pump, and pump upon them and pour off the water again and again, till it is clear; then wring them and hang them on the line. In this way one wringing is saved, which is well, for it is some of the hardest work that is done. The heaviest kind of counterpanes, especially if they are large, should be rinsed at a pump, and taken in the tub to the clothes-line, and put upon it without wringing.

COAT, To Clean.—First clean the coat of grease and dirt, then take one gallon of a strong decoction of logwood made by boiling logwood chips in water. Strain this liquid, and when cool, add two ounces of gum Arabic in powder, which should be kept in well-stopped bottles for use. Then go gently over the coat with a sponge wet in the above liquid diluted to suit the color, and hang it in the shade to dry. After which brush the nap smooth, and it will look as good as new. The liquid will suit all brown or dark colors if properly diluted, of which it is easy to judge.

COAT COLLARS, To Clean.—For cleaning coat collars and all woolen goods I recommend the Soap-tree Bark, which can be procured at the drug stores. Break a piece about two inches square, into small bits, and pour over it a half pint of boiling water; let it stand an hour or two, then sponge the collar well with the liquor; a second sponging with clear water will clean it nicely. Both washing and rinsing water should be as warm as for flannel. We have by using this bark washed black and blue Empress cloths successfully and have cleaned hair cloth chairs, which had been soiled by contact with the head.

COTTON, To Remove Mildew from.—For removing mildew from cotton cloth, mix soft soap and salt till stiff, rub on the mildewed places, and lay in the hot sun, leaving it out night and day, but taking great care the cloth thoroughly dries during the day, or it may mildew in other places.

CRAPE (Black), To Remove Water Stains from.—When a drop of water falls on a black

crape veil or collar, it leaves a conspicuous white mark. To obliterate this, spread the crape on a table (laying on it a large book or a paper-weight to keep it steady), and place underneath the stain a piece of old black silk. With a large camel's-hair brush dipped in common ink, go over the stain; and then wipe off the ink with a little bit of old soft silk. It will dry immediately, and the white mark will be seen no more.

CRAPE, To Renew when Old.—Wind the crape smoothly about a round stick a foot long—the end of a broom handle will do—and pin it. Have ready a tea kettle with water in it, boiling. Pass the stick with the crape on it back and forth in front of the spout, until the crape is thoroughly steamed, but not until it is wet with moisture. Then slip it off the stick, leaving it in the roll until fully dry. This process also renews the color. If the crape is very old and dingy, the success is not so gratifying.

CRIMSON DYE.—One ounce cream tartar, two of alum, one of cochineal—two drachms sal-ammoniac, four of pearlash or soda, six ounces wheat bran. Take a brass kettle with four gallons of soft water—when scalded, put in the cream-tartar and alum—let it boil—put in the cloth, and stir occasionally for an hour; take out the cloth, rinse in cool water, and air it; empty the kettle and put in as much water as before; add the bran tied in a bag, take off the scum which rises while it heats; take out the bag, add the cochineal, boil, put in the cloth, stir for an hour, rinse in cold water; then empty the water, put in as much of clean as before, warm, add the sal-ammoniac, put in the cloth, stir five minutes, then drain; now add the pearlash and mix it, again put in the cloth, stir for ten minutes, take out, air, rinse—the color will be permanent and beautiful.

CURTAINS, To Clean.—Never iron lace window curtains, and be careful not to make them blue with indigo. Stretch them upon a mattress to dry, pinning down carefully the extreme edge of every point or scallop.

DRESSES, MOURNING, To Restore when Faded.—Take two pints of water, and boil in it the following ingredients until it is reduced to one pint: two ounces of Aleppo galls, in powder; two ounces of logwood; one ounce of gum Arabic; then add one ounce of sulphate of iron. Let it evaporate to a powder. *Another receipt.*—Gall, eight ounces; logwood, one ounce; green vitriol, one ounce; iron filings, one ounce; sumac, one ounce; vinegar, one quart.

DRESSES, To Preserve the Color of.—The colors of merinos, mousseline de laines, gingham, chintzes, printed lawns, etc., may be preserved by using water that is only milk warm; making a lather with white soap before you put in the dress, instead of rubbing it on the material; and stirring into a first and second tub of water a large tablespoonful of ox gall. The gall can be obtained from the butcher, and a bottle of it should always be kept in every house. No colored articles should be allowed to remain long in the water. They must be washed fast, and then rinsed through two cold waters. Into each rinsing water, stir a teaspoonful of vinegar, which will help to brighten the colors; and after rinsing, hang them out immediately. When ironing-dry (or still a little damp), bring them in; have irons ready heated, and iron them at once, as it injures the colors to allow them to remain damp too long, or to sprinkle and roll them up in a

covering for ironing next day. If they cannot be conveniently ironed immediately let them hang till they are quite dry; and then damp and fold them on the following day, a quarter of an hour before ironing. The best way is not to do colored dresses on the day of the general wash, but to give them a morning by themselves. They should only be undertaken in clear bright weather. If allowed to freeze, the colors will be irreparably injured. We need scarcely say that no colored articles should ever be boiled or scalded. If you get from a shop a slip for testing the durability of colors, give it a fair trial by washing it as above: afterwards, pinning it to the edge of a towel, and hanging it to dry. Some colors, (especially pinks and light greens), though they may stand perfectly well in washing, will change as soon as a warm iron is applied to them; the pink turning purplish, and the green bluish. No colored article should be smoothed with a hot iron.

DRAB DYE, DARK, for Woolen Yarn.—Boil one-eighth of a pound of green tea, in one quart of water. When the strength is out, add one-fourth of a teaspoonful of copperas. Place the yarn in while warm.

DRAB DYE, SILVER (Light).—For 5 lbs. goods—alum, 1 small teaspoon, and logwood about the same amount; boil well together, then dip the goods 1 hour; if not dark enough, add in equal quantities alum and logwood, until suited.

DYEING.—The art of fixing coloring matters uniformly and permanently in the fibres of wool, silk, linen, cotton, and other substances. Dyeing is a chemical process, and the mode of its performance depends upon the substance operated on. Thus, it is found that the process by which wool is dyed black, would only impart a rusty brown to linen. Wool unites with almost all coloring matters with great facility, silk in the next degree, cotton less easily than silk, and linen with even more difficulty. Preparatory to the operation of dyeing, each of these substances undergoes a species of preparation to free the fibres from adhering foreign matters, as dirt, grease, etc., which would prevent the absorption of the aqueous fluid to be afterwards applied, as well as impair the brilliancy of the edge. Wool is cleaned or scoured by means of a weak alkaline lye, soap and water, or putrid urine; the latter being very generally used for this purpose. Silk is cleaned from the natural varnish that covers it, by boiling with white soap and water. Cotton and linen are cleaned with alkaline lyes of more or less density. The substances so prepared are ready to undergo the various operations of dyeing.

Among the various coloring materials employed by dyers, some impart their tints to different substances by simple immersion in their infusions or decoctions, and have hence been called "substantive colors"; but by far the greater number only impart a fugitive dye, unless the fibres of the stuff have been previously filled with some substance, which has a strong affinity for the latter on the one hand, and the coloring material on the other. The substances applied with this intention are called "Mordants", and generally exercise the double property of "fixing" and "striking" the color. Thus, if calico be dyed with a decoction of madder, it will only receive a fugitive and dirty red tinge, but if it be first

run through a solution of acetate of alumina, dried at a high temperature, washed, and then run through a madder bath, it will come out of a permanent and lively red. The principal mordants are the acetates of iron and alumina, sulphate of iron, alum, and some other chemical salts. A perfect knowledge of the behavior of mordants, with different coloring substances, is of paramount importance to the dyer.

After having received the proper mordants, the goods are dried and rinsed, after which they are passed for a shorter or longer time through an infusion, decoction, or solution of dyeing materials, which constitute the "dye-bath"; they are again dried and rinsed. In many cases, the immersion in the dye-bath is repeated, either with the same materials or with others to vary or modify the color. After the substances have been properly dyed, they are subjected to a thorough rinsing or washing in soft water, until the latter runs off uncolored.

DYEING with Acids in Brass Kettles.—The substance of the vessel in which articles are to be dyed is of considerable importance, especially where acid solutions are employed. Brass kettles are most generally used for such operations; but scarlet, as well as some other dyes, in which acids are used, can not well be introduced into such a vessel. Reimann's Journal of Dyeing advises, in this case, that half an ounce of quicksilver sublimate for every ten or fifteen pounds of wool to be dyed be first added to the solution of tin, and the whole well stirred up and then allowed to stand until the kettle becomes of a silvery white color, after which the wool is to be introduced and the dyeing prosecuted in the usual manner. During the process the mercurial coating gradually becomes removed, and is subsequently to be renewed. The work is thus carried on in what is equivalent to a quicksilver kettle, since the brass is completely coated with a layer of this metal.

DYES, FIXING.—Mr. Kipping of Manchester, England, has a new process of fixing dyes. He dissolves 20 ounces of gelatine in water and adds three ounces of bichromate of potash. This is done in a dark room. The coloring matter is then added and the goods submitted thereto; after which they are exposed to the action of light, the pigment thus becomes insoluble in water and the color is fast.

EMBROIDERY and GOLD LACE, To Clean.—For this purpose no alkaline liquors are to be used; for while they clean the gold, they corrode the silk, and change its color. Soap also alters the shade, and even the species of certain colors. But spirit of wine may be used without any danger of its injuring either color or quality; and, in many cases, proves as effectual for restoring the lustre of the gold, as the corrosive detergents. But, though spirit of wine is the most innocent material employed for this purpose, it is not in all cases proper. The golden covering may be in some parts worn off; or the base metal, with which it has been alloyed, may be corroded by the air, so as to leave the particles of the gold disunited; while the silver underneath, tarnished to a yellow hue, may continue a tolerable color; to the whole, so it is apparent that the removal of the tarnish would be prejudicial, and make the lace or embroidery less like gold than it was before.

FEATHERS, To Dye.—To dye them black,

they should first be dipped in a mordant of acetate of iron, and then in a decoction of madder and logwood, which should be boiling when used. To produce blue feathers, indigo should be used. For crimson feathers, use a mordant of acetate of alumina, and then dip them in a decoction of Brazil wood in a boiling state. The feathers will now be found to have a deep red hue; the crimson tint may be imparted by dipping them in a bath of cudbear. To obtain rose-colored feathers use lemon juice and safflower. Yellow feathers are prepared by using, first, a mordant of acetate of alumina, and then dipping them in a solution of turmeric. The addition of a little soda to the solution of turmeric will give an orange tint to the feathers. For green, use a solution of indigo and turmeric; and for lilac a solution of cudbear. These solutions should be used in a boiling state, and the feathers allowed to simmer in them until they have assumed the required tint. Before the feathers are immersed in any of the dyes, they should be dipped into hot water, and allowed to drain before they are plunged into the boiling coloring matter. As soon as they are taken out of the dye, they should be rinsed two or three times in cold water, and then laid before a moderately hot fire to dry. When they begin to dry, the feathers should be passed gently between the thumb and finger until they resume their original form. The feathers may be curled by passing the vanes or laminae, on each side of the central shaft over a blunt piece of iron, such as the back of a knife.

FEATHERS (Ostrich), To clean.—Cut some white curd soap in small pieces, pour boiling water on them, and add a little pearlsh. When the soap is quite dissolved, and the mixture cool enough for the hand to bear, plunge the feathers into it, draw the feathers through the hand till the dirt appears squeezed out of them, pass them through a clean lather with some blue in it, then rinse in cold water with blue to give them a good color. Beat them against the hand to shake off the water, and dry by shaking them near a fire. When perfectly dry, curl each fibre separately with a blunt knife or ivory paper-folder.

FEATHERS (White), To clean.—Wash them well in soft water, with white soap and blue; rub them through very clean white paper, beat them on the paper, shake them before the fire, dry them in the air, and afterward curl them.

FLANNEL (New), To Wash.—Cut the soap small and boil it in a little water. Have two tubs with water as hot as the hands can bear; previously blue the water well, to keep the color of the flannel, and put some of the boiled soap into one tub to make a lather; then wash the flannel without squeezing it. Put it into the other tub, and wring it in a large towel. Shake it out then, and, after drying it smooth with a cool iron.

The flannels should not be rubbed with soap, nor should the material itself be rubbed, as in washing linen, etc.; the fibres of the wool contain numberless little hooks, which the rubbing knots together; hence the thickening of the fabric and consequent shrinking in its dimensions.

FLANNEL, To Whiten when yellow.—Flannel which has become yellow with use may be whitened by putting it for some time in a solution of hard soap, to which strong ammonia has been added. The proportions we give are one

and a half pounds of hard curd soap, fifty pounds of soft water and two-thirds of a pound of strong ammonia. The same object may be attained in a shorter time by placing the garments for a quarter of an hour in a weak solution of bisulphite of soda to which a little hydrochloric acid has been added. This latter process, we dare say, will be effectual, and probably the oxalic acid solution mentioned above would answer the purpose as well.

GLOVES, To Dye.—Leather gloves, if not greasy, may be dyed with any of the ordinary dyes by brushing the latter over the gloves stretched out smooth. The surface alone should be wetted, and a second or third coat may be given after the former one has become dry. When the last coat has become thoroughly dry, the superfluous color should be well rubbed out, a smooth surface given them by rubbing with a polished stick or piece of ivory, and the whole gone over with a sponge dipped in white of egg.

GLOVES (Kid), To Clean.—1. Put the eggs on your hand and wash them, as if you were washing your hands, in some spirits of turpentine, until quite clean; then hang them up in a warm place, or where there is a current of air, and all smell of the turpentine will be removed.

2. To clean kid gloves, have ready a little new milk in one saucer, a piece of white soap in another, and a clean cloth folded two or three times. On the cloth spread out the glove smooth and neat. Take a piece of flannel, dip it in the milk, then rub off a good quantity of soap on the wetted flannel, and commence to rub the glove toward the fingers, holding it firmly with the left hand. Continue this process until the glove, if white, looks of a dingy yellow, though clean; if colored, till it looks dry and spoiled. Lay it to dry, and the operator will soon be gratified to see that the old glove looks nearly new. It will be soft, glossy, smooth, and elastic.

3. Wrap a fine cloth around your finger, dip it in new milk, and then rub on fine soap and rub the glove lightly. In all the above operations the glove must be on the hand.

4. Take fine curd soap, one pound, scrape it into a powder, put into a jar, and pour upon it from time to time, sufficient strong alcohol to make it into a thick jelly; add one teaspoonful of ether on one half teaspoonful liquor potassie, mix and put into bottles well corked. To use, put the gloves on the hands, rub on the preparation with a piece of flannel, when the dirt will disappear.

5. It is well known that common benzine is the best substance to take the greasy dirt out of leather gloves, as it does not attack the leather like most of the other substances sometimes used for that purpose. Those who make it a profession to clean gloves, put them all together in a large, wide mouthed jar with glass stopper, until it is about half full, cover the gloves with benzine, close the stopper, and shake the whole several times, letting it rest alternately. The gloves are then taken out, one by one, and examined. If any dirt spots have remained, they are rubbed out with benzine; the glove is then wrung out and hung up to dry. If such gloves were, however, to be worn after simply air drying, the higher temperature of the hand would cause the evaporation with an unpleasant odor of the benzine which, at the lower temperature, was left behind. Hence they are dried at a

temperature of some 200°, between plates heated with boiling water, which removes all traces of benzine, and consequent odor.

The benzine remaining in the bottle after having been used a few times becomes dirty; but as benzine is so cheap as to make it not worth while to recover it by redistillation when thus soiled, all glove cleaners throw it away.

GLOVES (White Leather), To Clean.—White leather gloves may be cleaned to look very well, by putting on one at a time, and going over them thoroughly with a shaving brush and lather. Then wipe them off with a clean handkerchief or sponge, and dry them on the hands by the fire or in the sun.

GLOVES (Wash-Leather), To Clean.—Remove the grease spots by rubbing with magnesia or cream of tartar, prepare a lather of lukewarm water and white soap; wash the gloves in it, wring them, and squeeze them through a fresh lather. Rinse first in lukewarm water, then in cold, and stretch them (on wooden hands, if possible) to dry in the sun or before a fire.

GREASE SPOTS, To Remove.—Dissolve an ounce of pure pearlsh in a pint of spring water, and to the solution add a lemon cut in small slices. Mix the ingredients well, keep the mixture in a warm state for a couple of days, then strain it and bottle the clear liquid for use. A little of this poured on stains of grease, pitch, or oil, will remove them. As soon as they disappear the cloth should be washed in clear water.

GREEN DYE, for All-wool Goods.—1. Clean the cloth or goods by steeping in soap suds, then rinse in several different messes of clean water, and lay aside moist.

2. Steep the cloth or goods one hour or longer in a bath made by dissolving the alum in the package marked, *Alum to mordant green on woolen*, in a clean brass or copper kettle, with the amount of clean water deemed necessary to work the goods in easily. After the conclusion of this steeping or mordanting, lift the goods from the bath, drain or wring well, and lay aside moist in a clean place.

3. Inclose the fustic chips in a bag of tow cloth, and steep them from one to two hours in a brass or copper kettle with the amount of clean water deemed necessary to work the cloth or goods in easily; then take out the bag of fustic, and let the bath cool to a blood heat. When the bath is thus cooled, add the sulphate of indigo paste in small portions at a time, stirring constantly, till the desired shade of green is obtained (a point to be ascertained by testing with a piece of unsized paper after each addition of the indigo paste); then put in the still moist cloth or goods, and work them thirty minutes at a little more than blood-heat; after which lift out the goods from the bath, and add the alum in the package marked, *Alum to raise color in green on woolen*, and stir till dissolved; then put in the cloth or goods, and work again twenty minutes at the same degree of heat; lift out, cool thoroughly, rinse in several different messes of clean water, and dry in the shade.

A single pound of woolen goods requires about four gallons of water to work it in easily, either when mordanting or when dyeing. Larger quantities of these goods do not need quite so much water in proportion. Use a clean wooden rod for stirring this dye.

GREEN DYE for Cotton.—1. If the cotton is new boil in weak lye or strong suds; then wash, and dry; give the cotton a dip in the home-made blue dye-tub until blue enough is obtained to make the green as dark as required, take out, dry, and rinse the goods a little; then make a dye with fustic, $\frac{3}{4}$ lb., logwood, 3 oz., to each 1 lb. of goods, by boiling the dye 1 hour; when cooled so as to bear the hand, put in the cotton, move briskly a few minutes, and let lie in 1 hour; take out, and let it thoroughly drain; dissolve, and add to the dye, for each lb. of cotton, blue vitriol, $\frac{1}{2}$ oz., and dip another hour; wring out, and let dry in the shade. By adding or diminishing the logwood and fustic, any shade of green may be obtained.

2. For cotton goods: One pound of fustic, two ounces of logwood and one ounce of blue vitriol, will color four or five pounds of goods. Boil the logwood and fustic until the strength is out, then add the vitriol, mix well, and put in the goods; stir ten or fifteen minutes, then wring them out and scour in strong soap suds.

3. For eight pounds of cotton goods, two pounds of fustic, two ounces of blue vitriol, one pint of soft soap, four ounces chips of logwood. Soak the logwood over night in soft water in a vessel of brass, place it over the fire in the morning, adding the other ingredients. When quite hot it is ready for dyeing; it makes no difference whether you wet the goods or not, provided you have dye sufficient to color well. You can obtain different shades by letting part of the goods remain longer in the dye.

GREEN DYE for Silk.—Take green ebony, boil it in water, and let it settle; take the clean liquor as hot as you can bear your hands in it, and handle your goods in it until of a bright yellow; then take water and put in a little sulphate of indigo; handle your goods in this till of the shade wanted. The ebony may previously be boiled in a bag, to prevent it from sticking to the silk.

HATS, To Dye.—The hats should be first strongly galled by boiling them a long time in a decoction of galls with a little logwood, that the dye may penetrate the better into their substance; after which a proper quantity of vitriol and decoction of logwood, with a little verdigris, are added, and the hats continued in this mixture for a considerable time. They are afterwards put into fresh liquor of logwood, galls, vitriol, and verdigris; and where the hats are of great price, or of a hair which with difficulty takes the dye, the same process is repeated a third time. For obtaining the most perfect color, the hair or wool is dyed blue previously to its being formed into hats.

HOSE (Woolen), To Wash.—If new, soak all night, then wash in hot suds with beef's gall, a tablespoonful to half a pail of water. Rinse till no color comes out. Then stretch on stocking frames, or iron them when damp on the wrong side.

INDIGO or CHEMIC, Extract of.—For good chemic or extract of indigo, take oil of vitriol, $\frac{1}{2}$ lb., and stir into it indigo, finely ground, 2 oz., continuing the stirring at first for $\frac{1}{2}$ hour; now cover over, and stir 3 or 4 times daily for 2 or 3 days; then put in a crumb of saleratus and stir it up, and if it foams, put in more and stir, and add as long as it foams; the saleratus neutralizes any excess of acid; then put

into a glass vessel and cork up tight. It improves by standing.

IRONING.—In ironing a shirt, first do the back, then the sleeves, then the collar and bosom, and then the front. Iron calicoes generally on the right side, as they thus keep clean for a longer time. In ironing a frock, first do the waist, then the sleeves, then the skirt. Keep the skirt rolled while ironing the other parts, and set a chair to hold the sleeves while ironing the skirt, unless a skirt-board be used. Silk should be ironed on the wrong side, when quite damp, with an iron which is not very hot; light colors are apt to change and fade. In ironing velvet, turn up the face of the iron, and after dampening the wrong side of the velvet, draw it over the face of the iron, holding it straight; always iron lace and needlework on the wrong side, and carry them away as soon as they are dry.

LAC RED DYE.—For 5 lbs. goods, argal, 10 oz.; boil a few minutes; then mix fine ground lac, 1 lb., with muriate of tin, 1½ lb.; and let them stand 2 or 3 hours; then add half of the lac to the argal dye, and dip ½ hour; then add the balance of the lac, and dip again 1 hour; keep the dye at a boiling heat, until the last half hour, when the dye may be cooled off.

LACE and MUSLIN, To Wash and Iron.—Muslin or lace should never be rubbed in washing. Take white soap in proportion to the muslin you have to wash, shave it down, and boil it with soft water till it dissolves. When cold, it should be as thick as jelly; mix a part of this jelly with soft tepid water, so as to be strong of the soap; let the muslins lie in this for a night, then add boiling water; move them up and down in the water, repeatedly squeezing them through the hands, so as to wash them, but do not rub them. Having steeped them well in soap and water before, makes rubbing quite unnecessary; tie them loosely up in a pillow-case, and with soft water and the rest of the boiled soap, boil them for a couple of hours. If in the country, they should be laid out on the grass to bleach (without the soap being washed out), and watered when necessary, so as to keep them moist. If in town, where no bleaching on the grass can be procured, put them into a washing tub, and, having poured boiling water over them, leave them in the back court in the air for the rest of the day, and during the night in the water; this has a great effect in whitening them; in either case, after being bleached, rinse them twice through cold water, to clear them completely from the soap, and hang them up to dry before being starched. A piece of lace, or any small article, can be very well bleached by being put outside the window in the sun, in a crystal bottle of water, having been previously washed, and the soap left in it. It is a frequent practice not to boil the starch, but to mix it with boiling water, to hang up the muslins or laces the moment they have been put through the starch, and squeezed out; and when dry, and as hard as a piece of board, then they water them (as it is called), leaving one spot dry and the rest wet, so that to stretch them out for ironing, without tearing them, is almost impossible. This mode of proceeding may account for the melancholy frequency of torn lace, and the dull heavy appearance of beautiful worked collars, looking as if they had been partially rubbed over with flour and water. To give them that light transparent

look which adds so much to their beauty, the treatment must be very different; the starch should be mixed in a little cold soft water, and bruised down with the back of a spoon till quite smooth; more water should be added, till it resembles thin milk, then boiled in a glazed-stone pipkin, till it becomes clear and thick, so as to jelly when cold. The muslin and laces should be put through the starch while it is still warm; squeezed out first in the hand, then gently in a clean smooth cloth, so as to get as much as possible of the starch out without fraying them in any way. The cloth must not be twisted round in the slightest degree, but gently pressed between the hands, putting but a few of the articles in at one time; each article should then be taken separately, held lightly by the two ends with the forefinger and thumb of each hand, and beaten between the palms of both hands for a few minutes; next shaken out and drawn, so that each thread in the muslin is perfectly straight, and the shape of the collar is carefully preserved. If after holding it up between you and the light, you find that in some parts it is not sufficiently clear, then a little drawing up and down on those spots will be necessary, so as to free every thread from the starch. It should then be folded up in a damp cloth, and each article put beside it, as soon as it has gone through the same process, so that the whole may have a slight degree of dampness when ironed. When it is not convenient to do up muslins the moment they are starched, it answers well, after they have been squeezed in the cloth, to fold up each article, and to leave them wrapped up together in a cloth for some hours, or a night, to clear themselves. When this is done they generally require only to be drawn a little, and folded up for ironing; but where great clearness is to be obtained, the stiffer the starch and the more they are beaten the better. In getting up fine things well much also depends on the ironing. The ironing blanket should be thick, so that the work on the collars, etc., should have a raised look after being ironed. When the blanket is thin the hard surface of the table flattens the work, and injures the appearance. The ironing blanket should be covered with a piece of thin, smooth, long cloth kept for the purpose, and washed each time it is used. In spreading out the collar, or whatever you are about to iron, see that it lies perfectly even, and that each thread is straight up and down; also that the iron has been carefully cleaned, first rubbed on a piece of old carpet, and then wiped with a cloth; and also that it is not too hot. Singeing is a common fault with the inexperienced, and it is a very bad one; for, even when it is not to such a degree as to burn, which may easily happen with a very thin muslin, still it leaves a yellow shade, which not only destroys the appearance at the time, but is very difficult to get rid of. A little practice in handling the irons will soon accustom one to the degree of heat necessary, and till that is the case an old pocket handkerchief, or some such thing, should be at hand to try each iron upon before you venture to iron any thing of consequence. Do not pass your iron frequently over the same place if you wish the muslin to retain the stiffness, and also you should hang the article on a screen before the fire the moment it is ironed; it becomes soft if folded up with the slightest dampness upon it. Lace, which to look well

should not be stiff, is improved and cleared by being put through cold water as soon as it has been starched; it should then be squeezed out, held by each hand, very slightly beaten between the palms of the hands, and gently drawn out. In drawing out the edge the nails must never touch it. It should all be done by the ball of the thumb and the forefinger, and ironed once or twice over to take out the stiffening. When lace is sewed to a muslin collar, and washed with it, as the collar requires to be stiffer than the lace, it will be necessary, after putting it through the starch, and clearing it, by heating and drawing it, to gather the lace together in the hand, and dip it into cold water, so as to take out a good deal of the starch, taking care not to wet the collar; but this is only necessary where the lace is put on with very little fullness, or quite plain. Where it is put on full enough to be set up in small pipes with the French irons, or, rather, curling tongs (as they may be called), it is not necessary to extract any portion of the starch; the lace is the better for being stiff, and, if rather damp when set up in these small pipes, they will retain a regular and tidy appearance as long as the collar can be worn. These small French irons are to be got of different sizes, and answer remarkably well for nightcap borders, or frills of any kind. When making use of them you should be near a stove or fire, where they can be frequently heated; for, as they can not be used when very hot, for fear of singeing the lace, they require to be constantly heated, and must be wiped with a cloth each time before being used.

LACE (White Silk) or Blond, To Wash.—Take a black bottle covered with clean linen or muslin and wind the blond round it, (securing the ends with a needle and thread,) not leaving the edge outward, but covering it as you proceed. Set the bottle upright in a strong cold lather of white soap and very clear soft water, and place it in the sun, having gently with your hand rubbed the suds up and down on the lace. Keep it in the sun every day for a week, changing the lather daily, and always rubbing it slightly when you renew the suds. At the end of the week, take the blond off the bottle, and (without rinsing) pin it backward and forward on a large pillow covered with a clean tight case. Every scallop must have a separate pin; or more, if the scallops are not very small. The plain edge must be pinned down also, so as to make it straight and even. The pins should be of the smallest size. When quite dry, take it off, but do not starch, iron, or press it. Lay it in long loose folds, and put it away in a pasteboard box.

Thread lace may be washed in the same manner.

LACE (Black), To Clean.—Sponge the lace carefully with green tea, and wind it round and round a bottle to dry, for if touched with an iron it would look glossy and flattened. Some people fill the bottle with warm water, which causes the lace to dry more quickly. It must not be placed near the fire, as it would give it a rusty appearance.

LACE, To Renovate.—Lace, we are told, may be restored to its original whiteness by first ironing it slightly, then folding it up neatly, and sewing it into a clean linen bag. This bag is now kept for twenty-four hours in pure olive oil, while in the meantime a strong solution of soap

is made in water. The bag, on being taken out of the oil, is put into this boiling solution, and kept there for a quarter of an hour; after which it is taken out, well rinsed in lukewarm water, and then dipped into water containing a slight proportion of starch. All that remains to be done now is to take the lace out of the bag, iron it, and stretch it with pins till perfectly dry.

LACE (Gold or Silver), To Clean.—Lay the lace smooth on a woollen carpet or piece of woollen cloth, and brush it free from dust, then burn rock alum and powder it fine, and afterwards sift it through a lawn sieve; then rub it over the lace with a fine brush, and in so doing it will take off the tarnish and restore it to its brightness, if it be not too much worn on the threads.

LAMA DRESS, To Wash.—Boil one pound of the best rice in one gallon of water for three hours. When boiled pour off what will be sufficient to starch the dress; wash the dress well in the remainder, rinse it in clean cold water, wring it well, then starch it with the rice water that was kept for that purpose, and hang it before the fire to dry. When dry enough iron with a cool iron, as it is liable to scorch. If some parts of the dress get too dry, they must be damped with a wet cloth whilst ironing. No soap must be used. The best way is to boil the rice on the previous day, and merely warm it up the next morning, for then you have the day before you to complete the whole, as the dress must on no account lie damp, even for an hour, or the colors will be sure to run. This receipt will be found equally well suited to delicate painted muslins and piqués as to lama and alpaca dresses.

LAWNS, To Wash.—Delicate lawn and muslin dresses are so frequently spoiled by bad washing, the colors of the fabric yielding so readily to the action of soap, that it is well to adopt a new method of cleansing the finest materials, and imparting to them the appearance of newness. Take two quarts of wheat bran and boil it for half an hour in soft water. Let it cool, then strain it, and pour the strained liquor into the water in which the dress is to be washed. Use no soap, one rinsing alone is required, and no starch. The bran water not only removes the dirt, and insures against change of color, but gives the fabric a pleasanter stiffness than any preparation of starch. If the folds are drawn from the skirts and sleeves, the dress will iron better; and will appear, when prepared in this way, as fresh as new.

LINEN (Table), To Wash.—It is poor economy to boil or freeze table cloths if brown. It gives them an old, yellow look. White ones may be kept clear by spreading for a few hours in the hot sun, or on the snow when the sun shines. If there are fruit stains on them pour boiling water over them before washing. The boiling and freezing make them soft, and once hanging on the line in the air and freezing dry wears linen more than two weeks constant use. A little starch should be added to the last water and they should be hung up straight on frames to dry. If they dry in a twist, they cannot be ironed smooth without extra pains.

LINEN, To Remove Stains from.—Stains occasioned by fruit, iron rust, and other similar causes, may be removed by applying to the parts injured a weak solution of the chloride of lime—the cloth having been previously well washed

—or of soda, oxalic acid, or salts of lemon in warm water. The parts subjected to this operation should be subsequently well rinsed in soft, clean, warm water, without soap, and be immediately dried in the sun.

LINEN, WHITENING.—According to a French writer, crystallized carbonate of soda, although so great a favorite with the washer-women, is a declared foe to linen, since, notwithstanding its cleansing power, it attacks the fibre, and after a time makes it so rotten as to cause it to tear, almost at the touch. An improvement on this substance, it is said, consists in the employment of a solution in the proportion of two pounds of soap to twenty-five quarts of warm water, to which are to be added one tablespoonful of essence of turpentine and three spoonfuls of ammonia. The mixture is to be stirred by the help of a little broom, and the linen immersed in it for several hours, the tub being completely covered. The articles are then to be washed in the ordinary way, rinsed in tepid water, and then blued, if this is necessary. The same solution can be used twice over by heating again and adding half the amount given of essence of turpentine and ammonia.

It is claimed that this process is accompanied by great economy of time, labor, and fuel, and that the linen experiences little or no injury, appearing finally in a condition of irreproachable whiteness. The ammonia, it is said, does not exert any corrosive effect upon the fibre, since it evaporates immediately; and the odor of the turpentine entirely disappears in drying.

LINEN, Sizing of.—The peculiar smooth linen called Holland in the United States, and used for window-shades, is sized with the following preparation: Carbonate of soda, (crystallized,) 1 part; white wax, 4 to 6 parts; stearine, 4 to 6 parts; pure white soap, 4 to 6 parts; fine Paris white or carbonate of magnesia, 20 parts; potato-starch, 40 parts; fine wheat-starch, 160 parts.

This is boiled with sufficient water to form 1600 parts altogether. If necessary, some ultramarine is added to counteract the yellow tint of the linen. The linen is starched with this preparation, passed between rollers, and dried. It is then sprinkled with soap-water and placed in the stamping-mill, afterward steamed and calendered.

A mixture of the first four or five ingredients named above is sold by druggists as a preparation for improving the starch used for stiffening shirt-collars, etc.

LILAC DYE.—For every pound of silk, take one and a half pound of archil, mix it well with the liquor; make it boil a quarter of an hour, dip the silk quickly, then let it cool, and wash it in river water, and a fine half violet, or lilac, more or less full, will be obtained.

LIQUID DYE COLORS.—1. (Blue.) *a.* Dissolve litmus in water, and add $\frac{1}{2}$ of spirit of wine. — *b.* Dilute Saxon blue or sulphate of indigo with water. If required for delicate work, neutralize the acid with chalk. — *c.* To an aqueous infusion of litmus add a few drops of vinegar, till it turns full blue.

2. (Purple.) *a.* Steep litmus in water and strain. — *b.* Add a little alum to a strained decoction of logwood. — *c.* Add a solution of carmine (red) to a little blue solution of litmus or Saxon blue.

3. (Green.) *a.* Dissolve crystallized verdigris in water. — *b.* Dissolve sap green in water, and add a little alum. — *c.* Add a little salt of tartar to a blue or purple solution of litmus, till it turns green. — *d.* Dissolve equal parts of crystallized verdigris and cream of tartar in water, and add a little gum arabic. Used as an ink for writing.

4. (Yellow.) *a.* Dissolve gamboge in water, and add a little gum arabic and alum. Used for ink, to stain paper, color maps, etc. — *b.* Dissolve gamboge in equal parts of proof spirit and water. Golden colored. — *c.* Steep French berries in hot water, strain, and add a little gum and alum. — *d.* Steep turmeric, round zedoary, gamboge, or annatto, in spirits of wine. — *e.* Dissolve annatto in a weak lye of subcarbonate of soda or potash. All the above are used by artificial florists.

5. (Red.) *a.* Macerate ground Brazil in vinegar, boil a few minutes, strain, and add a little alum and gum. — *b.* Add vinegar to an infusion of litmus till it turns red. — *c.* Boil or infuse powdered cochineal in water; strain, and add a little alum and gum. — *d.* Dissolve carmine in liquor of ammonia, or in weak carbonate of potash water; the former is superb.

All the preceding, thickened with a little gum, are used as inks for writing, as colors to tint maps, foils, paper, artificial flowers, etc., and to paint on velvet. Some of them are very beautiful. It must be observed, however, that those made with strong spirit do not mix well with gum, unless diluted with water.

MADDER RED DYE for Wool.—To each lb. of goods—alum 5 oz.; red, or cream of tartar, 1 oz.; put in the goods and bring your kettle to a boil for $\frac{1}{2}$ hour; then air them and boil $\frac{1}{2}$ hour longer; then empty your kettle and fill with clean water, put in bran 1 peck; make it milk warm and let it stand until the bran rises, then skim off the bran and put in madder $\frac{1}{2}$ lb.; put in your goods and heat slowly until it boils and is done. Wash in strong suds.

MERINOS, To Wash.—An old merino may be made to look as good as new by first ripping to pieces the skirt, and afterward washing each breadth separately in warm suds, being careful to rinse only in clean warm water suds. Cold water after warm will shrink any kind of woolen goods. Iron while quite damp on the wrong side. Afterward fold one double on the right side; placing over it a clean newspaper, and iron with a very hot flat, in this way making the seam fold in all new double folded goods.

MILDEW, To Remove.—Take two ounces of chloride of lime, pour on it a quart of boiling water, then add three quarts of cold water; steep the linen twelve hours, when every spot will be extracted.

MUSLINS, PIQUES, ETC., French Method of Washing.—Prepare some rather warm (not hot) lather, made with soft water and the best white soap; wash the dresses one at a time, but do not soak them. As soon as the first lather looks soiled squeeze the dress from it, and at once wash it again in a fresh lather. When thoroughly clean, rinse in pure cold water, lastly in water slightly blued; squeeze (not wring) the water completely from the dress, and hang it in a shaded place to dry; if wet weather, dry it by the fire. The best prints will fade if hung in the sunshine.

NANKEEN DYE.—Annotto and potash,

equal parts; water sufficient; boil till dissolved. The proportion of potash is varied according to the shade required; the alkali darkens it. Used to dye nankeen color, but chiefly to restore the color of faded nankeen clothing.

ORANGE DYE.—This may be given by mixing red and yellow dyes in various proportions. A very good fugitive orange may be given with annatto, by passing the goods through a solution made with equal parts of annatto and pearlash; or still better, through a bath made of 1 part of annatto dissolved in a lye of 1 part each of lime and pearlash, and 2 parts of soda. The shade may be reddened by passing the dyed goods through water acidulated with vinegar, lemon-juice, or citric acid; or through a solution of alum. The goods are sometimes passed through a weak alum mordant before immersion in the bath.

ORANGE DYE for Cotton.—For 5 lbs. goods—sugar of lead 4 oz.; boil a few minutes, and when a little cool put in the goods, dip 2 hours, wring out; make a new dye with bichromate of potash 8 oz.; madder 2 oz.; dip until it suits; if the color should be too red, take off a small sample and dip it into lime water, when the choice can be taken of the sample dipped in the lime or the original color.

ORANGE DYE for Wool.—For 5 lbs. goods, muriate of tin, 6 tablespoons; argal, 4 oz.; boil and dip 1 hour; then add to the dye, fustic, 2½ lbs.; boil 10 minutes, and dip ½ hour; and add again to the dye, madder, 1 teacup, dip again ½ hour.

Cochineal in place of madder makes a much brighter color, which should be added in small quantities until pleased. About 2 oz.

ORANGE DYE for Silk.—Bloodroot, boiled in brass, and set with alum, will color an orange color that is not easily faded. Old silk that is not very fair will do very well for this kind of color.

PINK DYE.—1. For every three pounds of goods, take three and a half quarts of water, or enough to cover the articles you wish to color. Take two ounces of cochineal, and a half an ounce of cream tartar, steep the cochineal in warm water two hours, or until the strength is entirely extracted, and add the cream tartar; then wash the cloth in clean water, wring it out and put it in the dye; bring it to a scalding heat; let it remain a few moments and it will be finished. If a light color is wanted use less cochineal—if a dark, more—the shade depending on the quantity of cochineal used.

2. Balm flowers, steeped in water, color a pretty rose.

3. Make a solution of the carmine in a carmine saucer, and set it with alum.

PINK DYE for Cotton.—Two pounds red-wood; four ounces of solution of tin; boil the wood one hour, turn off into a tub, then add the tin, and put in the cloth; let it stand a few minutes (five or ten), and a nice pink will be produced. This will color four pounds of goods; is quite a fast color.

PINK DYE for Wool.—For 3 lbs. of goods—alum, 3 oz.; boil and dip the goods 1 hour; then add, to the dye, cream of tartar, 4 oz.; cochineal, well pulverized, 1 oz.; boil well and dip the goods while boiling, until the color suits.

PINK DYE for Silk.—After aluming,

handle the goods to be dyed in peach-wood liquor till the color desired; then take out and put in a little alum liquor, handle the goods a little longer, take out, rinse in water, and finish. In most cases, where the shade is not dark enough, the operation must be repeated.

PINK for Listings.—To 100 pounds of wool use 8 pounds of cochineal, 5 pounds of tartar, 10 pounds of scarlet spirit, ½ pound of tin crystals. Boil all together until dissolved; then cool off the dye to 170° Fah.; enter and handle well; boil for half an hour. If the wool should not color even in ten minutes, use a few pounds of muriatic acid. (See "Scarlet on Wool.") If this color be used for listings on white flannels, add about 6 pounds more scarlet spirit to the wool, just before taking it out. This additional tin acid will fasten the cochineal more, without rotting the wool. The color will stand the soap better; and to keep the color from running before bleaching entirely, the scourer must add a solution of 1 pound of muriatic acid to the last rinsing of the flannel. If the cochineal should have stained the white, then rinse in cold water before fastening the spots, by the sulphur, when bleaching.

PONCEON.—100 pounds of fabric. Color scarlet first, as given in recipe for scarlet on wool, in another place, but leave out the flavine, or yellow dyestuff. After the goods are well rinsed, prepare a kettle with fresh water; heat it to 180° Fah.; strain into it 5 pounds of cochineal paste; stir all well together, and enter the fabric; handle it for half an hour without boiling; rinse and dry. Instead of ammoniated cochineal, 3 ounces of magenta crystals may be used.

PRINTS, To Prevent Fading.—The dress should be washed in lather, and not by applying the soap in the usual way direct upon the muslin. Make a lather by boiling soap and water together; let it stand until it is sufficiently cool for use, and previously to putting the dress into it, throw in a handful of salt; rinse the dress without wringing it in clear, cold water, into which a little salt has been thrown; remove it and rinse it in a fresh supply of clear water and salt. Then wring the dress in a cloth and hang it to dry immediately, spreading as open as possible, so as to prevent one part lying over another. Should there be any white in the pattern, mix a little blue in the water.

PURPLE DYE for Cotton.—Get up a tub of hot logwood liquor, enter three pieces, give them five ends, hedge out; enter them into a clean alum tub, give them five ends, hedge out; get up another tub of logwood liquor, enter, give them five ends, hedge out; renew your alum tub, give them five ends in that, and finish.

PURPLE DYE for Wool.—For 5 lbs. goods, cream of tartar, 4 oz.; alum, 6 oz.; cochineal, well pulverized, 2 oz.; muriate of tin, ½ teacup. Boil the cream of tartar, alum, and tin, 15 minutes; then put in the cochineal, and boil 5 minutes; dip the goods 2 hours; then make a new dye with alum, 4 oz.; Brazil wood, 6 oz.; logwood, 14 oz.; muriate of tin, 1 teacup, with a little chemic; work again until pleased.

PURPLE DYE for Silk.—For 1 lb. of silk—having first obtained a light blue by dipping in the home-made blue dye-tub, and dried, dip in alum 4 oz., to sufficient water to cover, when a little warm; if the color is not full enough add a little chemic.

RED DYES, on White Woolen Goods with Aniline Red. (*Solferino and Magenta Shades.*)

—1. Clean the cloth or goods by steeping at a gentle heat in weak soap-suds, then rinse in several different messes of clean water, and lay aside moist.

2. Put the aniline red powder into an earthen or metallic vessel, and add to it 128 times its weight of cold water, and stir with a spoon, or small, clean wooden rod, until dissolved. When the powder is dissolved, strain one-half of the strong liquor or solution through cotton cloth into a large brass, copper, or iron dye-kettle, and add cold water till the amount is reached that is needed to work the goods in easily, and then mix very thoroughly by stirring with a wooden rod. If any of the aniline red is found on the strainer undissolved, it must be transferred with a spoon to the vessel of cold water, and the whole well stirred. A little more cold water should also be added to the vessel.

3. The still moist cloth or goods are now to be shaken by their ends, with the hands, to remove the plaits or folds, and then put into the dye bath, which is to be gradually heated to a nearly scalding heat, and maintained at that temperature till the color on the goods is even, and of the desired depth. The goods are to be stirred constantly while they are in the dye-bath.

If the color is not dark enough, after the goods have been worked from fifteen to thirty minutes at a nearly scalding heat, lift them from the bath, strain in a little more of the strong, cold aniline solution from the earthen vessel, and stir till thoroughly mixed, then return the goods to the bath, and work them again from fifteen to thirty minutes. Repeat the removals of the goods from the bath, the strainings in of a little of the strong, cold aniline solution, and the steepings of the goods for short periods, till the color on the goods is of the desired shade; then remove from the bath, rinse in several different messes of clean water, and dry in the shade.

This process is adapted for either a Solferino or Magenta shade of red. The Solferino shade requires only about two-thirds as much of the aniline red as is required for the Magenta shade.

Silk goods, and mixed goods of cotton and wool, and also cotton goods may be dyed by this process. The color is not so handsome nor so durable on cotton as on woolen or silk.

A single pound of woolen goods requires about four gallons of water to work it in easily, when dyeing. Larger quantities of these goods do not need quite so much water in proportion.

For the preliminary solution of the aniline-red powder in the earthen vessel for one pound of goods, Magenta shade, use about one quart of cold water.

If aniline-red powder is heated in a kettle with water, a large portion of it will concrete on to the kettle, and become almost insoluble. For this reason it should be dissolved in a little cold water before added to the dye-bath.

When convenient or practicable, let the aniline red powder remain in the vessel of cold water over a night, before straining and using.

These aniline red colors can be dyed in much less time, when the expense can be afforded, by first dissolving the aniline red in a bottle with a little warm alcohol. The alcoholic solution or tincture is to be added from time to time to the

warm or hot dye-bath, till the color on the goods is of the desired shade. The goods are to be removed from the dye-bath before each addition of the alcoholic solution, and the bath is to be well stirred before the goods are returned. The alcoholic solution should be first dropped into a little water, and well mixed, and the mixture should then be strained into the dye bath.

If a particle of aniline red gets into the dye-bath before dissolved, it will cause the goods to be spotted, or dyed unevenly.

Utensils that have been used with aniline red may be cleaned first with water, then with a warm mixture of water and chloride of lime, and lastly with clean water. Alcohol will be required to remove any concretions of aniline red that may be found on kettles or utensils.

For one pound of woolen goods, Magenta shade, 96 grains of aniline red will be required. *S. Aniline red for one pound of woolen goods, Magenta shade.* For a Solferino shade on a pound of goods, put up 64 grains of aniline red, *S. Aniline red for one pound of goods, Solferino shade.*

For 96 grains of aniline red six fluid ounces of alcohol will be required. More alcohol can be used with advantage, when the expense can be afforded. An avoirdupois ounce of commercial aniline red requires from four to eight gills of alcohol for its complete solution, but most generally six gills are sufficient. Troy or apothecary grain weights are to be used in putting up these dyes, as the grain weight is the same in quantity in all the systems of weights used in drug stores.

RED, HYPERNIC.—Hypernic red is generally used for carpets and zephyrs. 100 pounds of yarn are boiled in a solution of 15 pounds of alum, and 3 pounds half-refined tartar, for one hour, or, what is just as well, laid over night in the hot liquid. The color is much improved if this prepared yarn can lay a few days in the atmosphere before coloring it red. In fresh water boil 30 pounds of hypernic, or beechwood, for ten minutes. Cool the liquid to 170° Fahr.; then add 3 pounds of whiting, or chalk; handle in this the prepared yarn, for ten minutes; bring up the heat to 200°, when the yarn will be a fine red; in half an hour it will be ready to take out and cool. For carpet yarn, it is not necessary to rinse, but to dry as it is. If hard water is to be used, as in some localities, the chalk is unnecessary; but the latter surely adds brilliancy to the color, equaling cochineal. Use in the preparation no blue vitriol, which dulls the color.

RED DYE for Cotton. Take muriate of tin $\frac{3}{4}$ of a tea-cup; add sufficient water to cover the goods well, bring it to a boiling heat, putting in the goods 1 hour, stirring often; take out the goods and empty the kettle and put in clean water with nic-wood 1 lb., steeping it for $\frac{1}{2}$ hour, at hand heat; then put in the goods and increase the heat for 1 hour, not bringing to a boil at all; air the goods and dip an hour as before; wash without soap.

RED MADDER.—This color is mostly used for army uniforms. To 100 pounds of fabric, use 20 pounds of alum, 5 pounds of tartar, and 5 pounds of scarlet spirit. After these are dissolved, enter the goods, and let them boil for two hours; then take them out, let cool, and lay over night. Into fresh water stir 75 pounds of

good Holland madder. Enter the fabric at 120° Fah., and bring it up to 200° in the course of an hour, during which time it must be handled well to secure evenness; then rinse and dry.

DYEING TURKEY RED.—This is a tedious, long process, and only profitable when produced in large quantities. The most expensive works for this purpose are in Elberfeld, Prussia, and the following is one of the methods there in use:

First Operation.—100 pounds of yarn are first boiled in a weak soda lye, and afterwards well rinsed in the river.

Second Operation.—Soak 25 pounds of sheep-dung for a few days in a solution of 10 pounds of soda; then add to it 6 pounds of olive oil; strain it through a sieve; then handle through this the yarn, skein after skein; wring each out loosely, and lay it on slats, but so that no large lumps accumulate, as it will heat and set it on fire; the yarn must be turned from time to time on the slats, to secure an even drying; then finish the drying in a moderately warm room of 148° Fah. After it is dry the same operation is gone through with as at first; and the yarn receives from two to four operations through the dung and oil, according to the darkness of the shade wanted; it must be dried each time.

Third Operation.—6 pounds of olive oil and 10 pounds of soda are mixed in about 6 pails of water; if the oil should not become mixed and some swim on the top, more soda is required. Handle the yarn, skein after skein, through this as before; wring out loosely, and hang it up again to dry; the drying out to be very slow, so as to give the oil time to ferment in connection with the oxygen, as it is considered that the warm oil can penetrate the fiber better; this operation also is repeated two or three times every time it is dried.

Fourth Operation.—To the old remaining oil-bath add a solution of 10 pounds of soda; take the yarn through again as before, and dry.

Fifth Operation.—Now lay the yarn into a warm solution of 10 pounds of soda for 5 hours, to free it from the superfluous oil not absorbed by the fiber, then rinse it well in the river.

Sixth Operation.—Take the yarn through a decoction of 20 pounds of ground nutgalls and 10 pounds of sumach, in sufficient water, skein after skein; wring it out, and dry in the open air; turn it often, so as to secure an even color.

Seventh Operation.—30 pounds of good alum, free from any iron, such as will not show a blue shade if a few drops of yellow prussiate of potash solution are added; otherwise it will not make a bright color. This alum is neutralized from its free sulphuric acid by a solution of 3 pounds of soda slowly added, so as not to boil it over by the too sudden escape of carbonic acid gas; pass the yarn through this yet warm solution of alum, wring it out, and dry as before, but not too hot, as the acid of the alum might injure the cotton or crystallize the alum.

Eighth Operation.—The yarn is now freed from the loosely superfluous alum adhering to the fiber by soaking it in warm water, and rinsing well in the river.

Ninth Operation.—Into a suitable warm bath stir 100 pounds of good madder; add 50 pounds of beef blood; stir it well and enter the yarn; handle quick at first, so as to get it even, and

bring it to a boil during 1 hour; then sling the skeins together and drop them into the liquor, and let them boil for one hour. It will be surer even by coloring only 25 pounds of yarn at a time; then rinse it.

Tenth Operation.—The yarn is again taken through an oil bath with soda as before and dried; then boil it in a solution of 5 pounds of olive oil, 6 pounds of castile soap, and 5 pounds of soda, from which it will come out bright red; then rinse it.

Eleventh Operation.—To still more brighten the color, without drying, put the yarn into clean bags and boil it for two hours in a bath containing 15 pounds of good white soap, 1½ pounds of tin crystals, and ½ pound of nitric acid.

Then take it out, rinse while yet hot, when it will be at last done.

This is the only fast-red which is good for bleached goods; others are less durable.

RED DYE for Wool.—A good and bright red color may be obtained on wool by the use of lac-dye, in the following way: In the first place, a tolerably stiff paste is made of the lac-dye and sulphuric acid, and this is allowed to stand for a day. For dyeing 10 pounds of wool, one pound of tartar, two thirds of a pound of salts of tin, and three quarters of a pound of the paste just mentioned are required. The wool must be boiled in the bath for three quarters of an hour, after which, as a matter of course, it must be carefully rinsed and dried.

RIBBONS, to Wash.—As washing and doing up ribbons is quite a source of economy, it is not every lady that knows that, with the exception of a few delicate colors, pink, sky-blue, &c., almost any ribbon can be washed and ironed, and made to look nearly if not quite as well as new. To wash ribbons, make a clear lather of clean white soap, the water as warm as you can bear your hands; rub the ribbon through this; soap may also be applied where there are grease spots on the wrong side; rinse in cold water. As soon as washed, without hanging out to dry, have ready a hot iron, and press them out while wet; press on the wrong side; they will wrinkle, and never look well, if not pressed while wet. If you wish to stiffen them, dip them before ironing, in a solution of gum arabic; when ironed smooth, take the scissors and trim off the ends. I have renewed narrow satin ribbons, yellow and white, in this way, when you would not know they had ever been worn; also wide colored ribbons, black, etc.

SCARFS (China Crape), To Wash.—If the fabric be good, these articles of dress can be washed as frequently as may be required, and no diminution of their beauty will be discoverable, even when the various shades of green have been employed among other colors in the patterns. In cleaning them make a strong lather of boiling water; suffer it to cool; when cold, or nearly so, wash the scarf quickly and thoroughly, dip it immediately in cold hard water in which a little salt has been thrown (to preserve the colors), rinse, squeeze, and hang it out to dry in the open air; pin it at its extreme edge to the line, so that it may not in any part be folded together; the more rapidly it dries the clearer it will be.

SCARLET (Cochineal) DYE, (old Mode).—In former times, when cochineal was very expensive, the goods were colored in two waters,

with nitrate of tin. By this process, the cochineal colors only the outside of the fabric (the cut showing white in broadcloth), and about thirty per cent. less of cochineal is used than in scarlet colored with muriate of tin in one operation; but it is useful for braided scarlet random. To 100 pounds of fabric dissolve 10 pounds of nitrate of tin, 5 pounds of cream of tartar, 1 pound of flavine. The nitrate of tin should be made thus: 10 pounds nitric acid, 36° B.; 5 pounds muriatic acid, 22° B.; 5 pounds water; mix these ingredients, and add 1 pound feathered tin, small quantities to prevent overheating. Boil it for ten minutes; cool off to 170°; enter the goods, and boil them for one hour; then take out, cool, and rinse. To fresh water add 7 pounds of cochineal, well ground, and 2 pounds of starch in solution, and strain; let all boil for five minutes; cool the dye to 180°; add 1 pound of nitrate of tin; handle the fabric well, and boil for three quarters of an hour; then take it out, cool, and rinse. This is a very bright scarlet, and is used for scarlet random; only use no flavine in the preparation of the random, to secure a good white. This scarlet requires two waters; the cochineal would not adhere to the wool with nitrate of tin, as it does with the muriate of tin in one operation. In all scarlets, the yellow shade is governed by the quantity of citron bark or flavine used. I find a very foolish habit, in many dye houses, of letting the liquor run half away after every dip is colored; the old liquor, or second kettle, makes not only a better color, but will save at least twenty per cent. of dye stuff and heat. Of course common sense must govern the judgment of the operator, or the acid will be too strong in the dye, after several dips.

SCARLET with LAC DYE.—For 100 pounds of flannel or yarn, take 25 pounds of ground lac dye, 15 pounds of scarlet spirit, (as below), 5 pounds of tartar, 1 pound of flavine, according to shade, 1 pound of tin crystals, 5 pounds of muriatic acid. Boil all for fifteen minutes, then cool the dye to 170° Fah.; enter the goods, and handle them quickly at first; let them boil one hour; rinse them while yet hot, before the gum and impurities harden. This color stands scouring with soap better than cochineal scarlet, but this is in consequence of a larger amount of acid being used than is necessary with cochineal scarlet. To this color, a small quantity of sulphuric acid may be used, as it dissolves the gum. The quantity of lac dye should be regulated by its quality.

SCARLET DYE for Wool.—For every 100 pounds of fabric, boil, in a suitable kettle, 11 pounds of ground Honduras cochineal, 5 pounds of half-refined tartar or 3 pounds of tartaric acid, 2 pounds of oxalic acid, 1 pound of tin crystals, 1½ pounds of flavine, 10 pounds of scarlet spirit. (The latter is prepared as follows: Take 16 pounds muriatic acid, 22° B., 1 pound feathered tin, 2 pounds water. The acid should be put in a stoneware pot, and the tin added, and allowed to dissolve; the mixture should be kept a few days before using.) After it has boiled for about fifteen minutes, cool the dye to 180° Fah.; enter the goods, handle them quickly at first, and let them boil slowly for one hour, when they will be a good scarlet. Take them out, cool, and rinse in cold water. If it should happen that the wool or flannel shows some white hair, which is

generally the case when new wool is used, then add 5 pounds of raw muriatic acid to the dye. This powerful agent will work wonders in scarlets, oranges, and pinks, as it tans the wool, which is perhaps a little greasy, and prevents the tin crystals from fastening too quickly to it, and thereby even colors are obtained. This latter fact is very valuable, and not generally known.

SHAWLS, SCARFS, etc., To Clean.—If the fabric be good, these articles of dress can be washed as frequently as may be required, and no diminution of their beauty will be discoverable, even when the various shades of green have been employed among other colors in the patterns. In cleaning them, make a strong lather of boiling water; suffer it to cool; when cold, or nearly so, wash the scarf quickly and thoroughly, dip it immediately in cold hard water in which a little salt has been thrown (to preserve the colors,) rinse, squeeze, and hang it out to dry in the open air; pin it at its extreme edge to the line, so that it may not in any part be folded together; the more rapidly it dries the clearer it will be.

SHAWLS (Woolen), Scotch Method of Cleaning.—Scrape one pound of soap, boil it down in sufficient water. When cooling, beat it with the hand; it will be a sort of jelly. Add three tablespoonfuls of spirit of turpentine, and one of spirit of hartshorn. Wash the articles thoroughly in it. Then rinse in cold water until all the soap is taken off, then in salt and water. Fold between two sheets, taking care not to allow two folds of the article washed to lie together. Mangle, and iron with a very cool iron. Shawls done in this way look like new. Only use the salt where there are delicate colors that may strike.

SHAWLS (Cashmere), To Clean the White Middle of.—Prepare a mixture of equal parts of camphor, W. I. molasses and clean soft soap. Fold a sheet and lay upon the bench or table used. Single your shawl and lay the white part upon the sheet, then with a clean white cloth rub the mixture thoroughly into all the white. Rub first the right side, then turn and rub the other side. Rinse thoroughly in luke-warm water, taking care not to wet the colors unnecessarily. Press the water out, and wring in a dry cloth. Iron while damp, crease through the middle and you will be surprised at the newness of your old shawl.

SHIRT-BOSOMS, To Polish.—Put a little common white wax in your starch, say two ounces to the pound; then if you use any thin patent starch, be sure you use it warm, otherwise the wax will get cold and gritty, and spot your linen, giving it the appearance of being stained with grease. It is different with collar starch—it can be used quite cold; however, of that anon. Now, then, about polishing shirts: starch the fronts and wristbands as stiff as you can. Always starch twice, that is, starch and dry, then starch again. Iron your shirt in the usual way, making the linen nice and firm, but without any attempt at a good finish; don't lift the plaits; your shirt is now ready for polishing, but you ought to have a board the same size as a common shirt board, made of hard wood, and covered with only one ply of plain cotton cloth. Put this board into the breast of your shirt, damp the front very lightly with a wet sponge, then take a polishing iron, which is flat and beveled a little at one end

—polish gently with the beveled part, taking care not to drive the linen up into wave-like blisters; of course this requires a little practice, but if you are careful and persevere, in a short time you will be able to give that enamel-like finish which seems to be so much wanted.

SHIRT COLLARS, To Dress.—For this purpose use the best starch, say two pounds, and four ounces of wax and six and a half pints of water; first dissolve the wax in the boiling water, take the vessel off the fire and allow it to stand for five minutes; during this time dissolve the starch in the smallest possible quantity of cold water, then pour it gradually into the vessel and boil for twenty-five minutes—keep stirring all the time; this starch can be used quite cold; rub it well into the collars, wring as tight as you can, finish by wringing in a cloth, then iron; thus you will have them stiff without being hard, and when well dressed will have that beautiful elastic finish so much admired in new collars.

SILK, To Clean.—1. Dresses cleaned by the following method have not the appearance of being cleaned: Quarter of a pound of honey, quarter of a pound of soft soap, two wine glasses of gin, three gills of boiling water; mix and let stand until blood-warm; spread the silk on a clean table with a cloth under it—there must be no gathers; dip a nail brush into the mixture, and rub the silk well, especially where there are stains or the most dirt or spots, and with a sponge wet the whole breadth generally, and rub gently; then rinse the silk in cold soft water; hang it up to drain, and iron it damp. The quantity stated is for a plain dress.—2. Grate raw potatoes to a fine pulp in water, and pass the liquid matter through a coarse sieve in another vessel of water; let the mixture stand undisturbed till the fine white particles of the potato are precipitated; then pour the mucilaginous liquor from the fecula, and preserve it for use. The article to be cleaned should be spread upon a linen cloth upon a table, and washed with a sponge dipped in the potato liquor, until the dirt is perfectly separated, then rinsed in clear water several times without wringing. Two middle sized potatoes will be sufficient for one pint of water. Iron whilst damp on the wrong side. Should the silk be of more than one color, it is desirable to wet a small piece first, lest the dress should be spoiled by moisture, causing the colors to run; but for self-colored silks, the direction is an excellent one; and satinets, even of light colors, if not greased or stained, make up again nearly equal to new.—3. Take a quarter of a pound of soft soap, a teaspoonful of brandy and a pint of gin; mix all well together and strain through a cloth. With a sponge or flannel spread the mixture on each side of the silk without creasing it; wash it in two or three waters and iron it on the wrong side. It will look as good as new, and the process will not injure silks of even the most delicate colors.

SILKS (Colored), To Clean.—Put some white soap into boiling water, and heat it until dissolved in a strong lather. At a hand heat put in the article. If strong, it may be rubbed as in washing; rinse it quickly in warm water, and add oil of vitriol, sufficient to give another water a sourish taste, if for bright yellows, crimsons, maroons, and scarlets; but for oranges, fawns, browns, or other shades, use no acid. For bright scarlet, use a solution of tin. Gently squeeze and then

roll it in a coarse sheet, and wring it. Hang it in a warm room to dry, and finish it by calendering or mangling.

For pinks, rose colors, and thin shades, etc., instead of oil of vitriol, or solution of tin, prefer lemon juice, or white tartar, or vinegar.

For blues, purples, and their shades, add a small quantity of American pearlash; it will restore the colors. Wash the articles like a linen garment, but, instead of wringing, gently squeeze and sheet them, and when dry, finish them with fine gum water, or dissolved isinglass, to which add some pearlash, rubbed on the wrong side; then pin them out.

Blues of all shades are dyed with archil, and afterwards dipped in a vat; twice cleaning with pearlash, restores the color. For olive-greens, a small quantity of verdigris dissolved in water, or a solution of copper, mixed with the water, will revive the color again.

SILK (White), To Bleach.—According to a French patent, an improvement upon the ordinary method of bleaching wool and silk by sulphur, consists in the use of a solution, in the proportion of four pounds of oxalic acid and four pounds of salt, in two quarts of water. This is said to be available for silk in all its forms, as well as for crude, carded, spun, or woven wool. The material is allowed to remain an hour in this fluid, and then is washed off in warm water and dried. Or wash the articles clean, rinse in suds, and smoke with brimstone while wet; the silk must be brushed or washed with a sponge; if rubbed, it will never press smoothly; expose the goods to the air, and the odor will soon pass off.

SILK (Black), To Renovate.—1. Boil an old black kid glove till it begins to dissolve, strain the water, and sponge with it the right side of the silk; iron while damp on the wrong side.—2. Take two raw potatoes of ordinary size, pare them, and remove the core if they are hollow. Slice them into a half pint of cold water, and leave them over night. The next morning, sponge the silk with the water, not wetting it too freely; then iron it, and its appearance will be greatly improved.—3. To bullock's gall, add boiling water sufficient to make it warm, and with a clean sponge rub the silk well on both sides; squeeze it well out, and proceed again in like manner. Rinse it in spring water, and change the water till perfectly clean, dry it in the air, and pin it out on a table; but first dip the sponge in glue water, and rub it on the wrong side; then dry it before a fire.

SILK (Black) Reviver.—Boil logwood in water half an hour; then simmer the silk half an hour; take it out, and put into the dye a little blue vitriol, or green copperas; cool it and simmer the silk for half an hour. Or, boil a handful of fig leaves in two quarts of water until it be reduced to one pint; squeeze the leaves, and bottle the liquor for use. When wanted sponge the silk with it.

SILK (White or very Light), To Clean.—Take one quart of lukewarm water, and mix with it four ounces of soft soap, four ounces of honey, and a good sized wineglass of gin. The silk must be unpicked and laid in widths on a kitchen table; then take a common scrubbing brush quite new, dip it in the mixture, and rub the silk firmly up and down on both sides, so as to saturate it. Rinse it in cold water twice until free from soap, hang it on a clothes horse to drain

until half dry; then iron it with a piece of thin muslin between it and the iron, or it will be marked on the ironed side. The silk when laid on the table must be kept quite smooth, so that every part may come under the brush. White silk requires a little blue in the water.

SILK, WASHING.—No person should ever wring or crush a piece of silk when it is wet, because the creases thus made will remain forever, if the silk is thick and hard. The way to wash silk is to spread it smoothly upon a clean board, rub white soap upon it, and brush it with a clean, hard brush. The silk must be rubbed until all the grease is extracted, then the soap should be brushed off with clean, cold water, applied to both sides. The cleansing of silk is a very nice operation. Most of the colors are liable to be extracted with washing in hot suds, especially blue and green colors. A little alum, dissolved in the last water that is brushed on silk, tends to prevent the colors from running. Alcohol and camphene, mixed together, is used for removing grease from silk.

SILK, WRINKLED.—To make silk, which has been wrinkled and tumbled, appear like new—sponge it on the surface with a weak solution of gum arabic or white glue, and iron it on the wrong side.

SILK, To Remove Grease from.—A sure and safe way to remove grease stains from silks is to rub the spot quickly with brown paper; the friction will soon draw out the grease; or lay the silk upon a table, with an ironing blanket under it, the right side of the silk downward; put a piece of brown paper on the top, and apply a flat iron just hot enough to scorch the paper. We have found this recipe more efficacious than any scouring drops ever compounded.

SILK, To Remove Wax Stains from.—Mix powdered French chalk with lavender water to the thickness of mustard. Put it on the stain, and rub it gently with the finger or palm of the hand. Put a sheet of clean blotting paper and brown paper over it, and smooth it with a warm iron. When dry the chalk must be removed, and the silk gently dusted with a white handkerchief. If a faint mark still remains, a second application of French chalk and lavender water will generally remove it. If the wax stain has fallen thickly on the silk, it should be removed first carefully with a penknife.

SILK STOCKINGS (White), To Wash.—Heat some rain or soft water, and while on the fire cut into it slices of good yellow soap, to make a lather; put the stockings in while the lather is warm, but not scalding, and wash them in two such waters (a wineglassful of gin in the first water is an improvement); rinse them well in lukewarm water, having ready a second rinsing water, in which is mixed a little blue (not the common kind, but such as is used for muslins and laces), or rose pink, which can be procured at the chemist's, and is used in the same way as the blue, by tying it up in a piece of flannel and squeezing it into the water. After rinsing, put the stockings between towels and let them get almost dry; place them on a small sheet, lay them out quite flat, as they are when first purchased, tack them to the sheet with a needle and thread, turn the sheet over them, and have them mangled. If it is not convenient to have them mangled, the next best plan is to put four or six stockings one upon the other between a piece of

calico, lay them on a stone doorstep, and beat them with the rolling pin. They must not be mangled or beaten in towels, as the pattern of the towels would be impressed on them. If the stockings have lace fronts they will more particularly require the tacking mentioned above to make them look nice. No soda or washing powder of any kind must be put to them, and they must be done quickly, and not left lying about.

SLATE DYE, For Cotton or Woolen.—Boil the bark in an iron kettle, skim out the chips after it has boiled sufficiently, and then add copperas to set the dye. If you wish it very dark add more copperas. This is excellent for stockings.

SLATE DYE, For Silk.—To make a slate, take a pan of warm water and about a teacupful of logwood liquor, pretty strong, and a piece of pearlash, of the size of a nut; take gray-colored goods, and handle a little in this liquor, and it is finished. If too much logwood is used, the color will be too dark.

SOAPSUDS, CLEARING.—It is generally known that a little dissolved alum is very effective in clearing muddy water; but recent experiments show its further virtues. In a place where water was scarce, a little alum was dissolved in hot water, and thrown into a tub of thick soap-suds. In a short time the soap curdled, and accompanied by the muddy particles, sank to the bottom, leaving the water above perfectly clear, pure, and devoid of smell. This water was found very useful for washing clothing, when poured off the sediment. A similar result was attained in a quick manner by filling a boiler with soap-suds, placing it on a fire, and throwing a bit of alum into it. When the suds boiled, the scum went over, and left the water clear, soft, and as useful for washing clothes as it had originally been.

STARCH, Alum in.—For starching muslins, gingham, and calicoes, dissolve a piece of alum the size of a shellbark, for every pint of starch, and add to it. By so doing, the colors will keep bright for a long time, which is very desirable when dresses must be often washed, and the cost is but a trifle.

STARCHING, CLEAR.—This is practiced as follows: Rinse the articles in three waters, dry them, and dip them in a thick starch, previously strained through muslin; squeeze them, shake them gently, and again hang them up to dry; and when dry, dip them twice or thrice in clear water, squeeze them, spread them on a linen cloth, roll them up in it, and let them lie an hour before ironing them. Muslins will look well when starched and clapped dry, while the starch is hot, then folded in a damp cloth till they become quite damp before ironing them. If muslins are sprinkled they are apt to be spotted. Some ladies clap muslins, then dry them, and afterward sprinkle them.

STARCH, FLOUR.—Mix flour gradually with cold water, so that it may be free from lumps. Stir in cold water till it will pour easily; then stir it into a pot of boiling water, and let it boil five or six minutes, stirring it frequently. A little spermaceti will make it smoother. This starch will answer very well for cotton and linen.

STARCH, GUM ARABIC.—Take 2 ounces of white gum arabic powder, put it into a pitcher, and pour on it a pint or more of boiling water

(according to the degree of strength you desire), and then, having covered it, let it set all night. In the morning pour it carefully from the dregs into a clean bottle, cork it, and keep it for use. A tablespoonful of gum water stirred into a pint of starch that has been made in the usual manner, will give the lawns (either white, black, or printed), a look of newness, when nothing else can restore them after washing. It is also good, much diluted, for thin white muslin and bobbinet.

STARCH, GLUE.—Boil a piece of glue four inches square, in three quarts of water. Keep it in a bottle well corked. Use for calicoes.

STARCH, To Improve.—To each bowl of starch add one teaspoonful of epsom salts, and dissolve in the usual way by boiling; the fabric thus starched will be considerably stiffer, besides being rendered to a certain degree fire-proof.

STARCH LUSTER.—A substance known by this title is used for washing purposes which, when added to the starch, causes the linen to which it is applied to assume not only a high polish but a dazzling whiteness. A portion of the size of an old-fashioned cent added to half a pound of starch, and boiled with it for two or three minutes, will produce the best results. This substance is nothing more than stearine, colored by a slight addition of ultra-marine blue, the essential ingredient being the stearine; and with or without the coloring matter, will be found to add very much to the beauty of linen articles to which it is applied.

STARCH POLISH.—Take common dry potato or wheat starch sufficient to make a pint of starch when boiled. Then add half a drachm of spermaceti, and half a drachm of white wax, and then use it as common starch, only using the iron as hot as possible. In this manner a brilliant polish is produced.

STEEL DYE (Dark).—Black wool—it may be natural or colored, 10 lbs.—white wool 1½ lbs. Mix evenly together and it will be beautiful.

STRAW COLOR for Silk.—Smartweed, boiled in brass and set with alum, will color a fine straw color.

STRAW BONNETS, To Bleach.—Straw hats which have turned yellow may be bleached by the use of a soap prepared by taking any good soda soap and precipitating it from its solution by means of common salt, and adding to it one-fourth the weight of sulphate of soda, previously rubbed into a mass with water, then drying the product. About equal parts, by weight, of water are to be poured upon this, and for every two pounds of soap, half an ounce of spirits of sal-ammoniac is to be added; and after the whole has assumed a gelatinous consistency, one part of the mass is to be dissolved in eight parts of warm water; smaller proportions of the foregoing will, of course, answer for a few articles. The objects to be bleached are to be washed by means of a brush in this solution, and transferred, while still moist, into water acidulated with hydrochloric acid (twenty-five parts water to one and a half of acid), and allowed to remain a few hours in this liquid. They are then to be washed with fresh cold water, and dried. Experiment has proved the results of this method of bleaching to be exceedingly satisfactory.

STRAW BONNETS, To Clean.—The bonnets may be washed with soap and water, then

rinsed in clear water, and dried in the air. They must then be washed over with white of an egg, well beaten. The wire must be removed before washing.

STRAW BONNETS, To Dye Chestnut Brown.—For twenty-five straw hats: 1 pound and a half of ground sanders, 2 pounds of ground curcuma, three-quarters of a pound of powdered gall nuts, or sumac, one-tenth of a pound of rasped logwood. These ingredients are allowed to boil in a kettle with the straw hats; the boiler, however, must be large enough so that the hats are not pressed against each other. After two hours' boiling the hats are withdrawn, rinsed, and allowed to remain over night in a bath of nitrate of iron of 4 degrees Baume, when they are washed. A darker brown may be obtained by increasing the quantity of sanders. When dry, the hats are brushed with a brush of dogs' (couch) grass, in order to give them the desired luster.

STRAW BONNETS, To Dye Black.—For twenty-five straw hats: They are put in a boiling bath of four pounds of logwood, one pound of gall nuts, or sumac, and one-half pound of curcuma, or fustic. The hats are allowed to remain therein for two hours. They are hereupon immersed in a bath of nitrate of iron of four degrees Baume, when they are carefully rinsed in water, dried, and brushed.

STRAW AND CHIP HATS, To Varnish Black.—Best alcohol 4 oz.; pulverized, black sealing-wax 1 oz.; put them into a vial, and put the vial into a warm place, stirring or shaking occasionally, until the wax is dissolved; apply it when warm by means of a soft brush, before the fire or in the sun.

It gives stiffness to old straw hats or bonnets, makes a beautiful gloss, and resists wet; if anything else is required, just apply it to small baskets also, and see how nicely they will look.

STRAW BONNETS, To Dye Silver Gray.—For twenty-five straw hats: In order to produce this color, the whitest hats must be selected; they are first softened in a bath of crystallized soda, to which some clear lime-water has been added. As dye-bath, the following decoction is used, and the hats are kept therein under constant boiling. The recipe for the bath is four pounds of pure alum, three-eighths of a pound of tartaric acid, some ammoniacal cochineal, and carmine of indigo; a little sulphuric acid may be added to this decoction according to necessity. The sulphuric acid is employed in order to neutralize the alkali of the cochineal dye. When the last mentioned ingredients are made use of, the hats are allowed to remain for an hour longer in the boiling bath, when they are rinsed in slightly acidulated water.

STRAW BONNETS, Slate Dye for.—First soak the bonnet in rather strong warm suds for 15 minutes to remove sizing or stiffening; then rinse in warm water, to get out the soap; now scald cudbear, 1 oz., in sufficient water to cover the hat or bonnet; work the bonnet in this dye, at 180° of heat, until you get a light purple; now have a bucket of cold water, blued with the extract of indigo, ½ oz., and work or stir the bonnet in this, until the tint pleases; dry, then rinse out with cold water, and dry again, in the shade. If you get the purple too deep in shade the final slate will be too dark.

STRAW BONNETS, To Dye Violet.—Take

four pounds of alum, one pound of tartaric acid, and one pound of chloride of tin. Dissolve these ingredients in water, and allow the hats to remain in the boiling solution two hours; add then so much of a decoction of logwood and carmine of indigo as is requisite for obtaining the desired shade, and rinse finally in water in which some alum has been solved. It is self-evident that for the above mentioned quantities of mordants and dyes the requisite amount of water has to be taken.

STRAW HATS, To Whiten.—Scrape stick sulphur with a knife, mix the powder to a mush with water, plaster it thickly over the straw, and place in the hot sun for several hours; brush off when dry. An easy and effectual plan.

SUMMER SUITS, To Wash.—Summer suits are nearly all made of white or buff linen, pique, cambric or muslin, and the art of preserving the new appearance after washing is a matter of the greatest importance.

Common washerwomen spoil everything with soda, and nothing is more frequent than to see the delicate tints of lawns and percales turned into dark blotches and muddy streaks by the ignorance and vandalism of a laundress.

It is worth while for ladies to pay attention to this, and insist upon having their summer dresses washed according to the directions which they should be prepared to give their laundress.

In the first place, the water should be tepid, the soap should not be allowed to touch the fabric; it should be washed and rinsed quick, turned upon the wrong side, and hung in the shade to dry, and when starched (in thin boiled but not boiling starch) should be folded in sheets or towels, and ironed upon the wrong side, as soon as possible.

But linen should be washed in water in which hay has been boiled, or a quart of bran. This last will be found to answer for starch as well, and is excellent for print dresses of all kinds, but a handful of salt is very useful also to set the colors of light cambrics and dotted lawns; and a little beef's gall will not only set but lighten yellow and purple tints, and has a good effect upon green.

VEILS (Black Lace), To Clean.—Pass them through warm water in which ox-gall has been dissolved, a tablespoonful to a quart of water, and then rinse in cold water. Stiffen by dipping in water in which a bit of gum arabic or glue has been dissolved; clap between the hands till almost dry, then pin out nicely on a frame or bed till entirely dry, and press between the folds of a sheet.

VEILS (White Lace), To Clean.—Put the veil into a strong lather of white soap and very clear water, and let it simmer slowly for a quarter of an hour. Take it out and squeeze it well, but be sure not to rub it. Rinse it in two cold waters, with a drop or two of liquid blue in the last. Have ready some very clear weak gum arabic water, or some thin starch, or rice water. Pass the veil through it, and clear it by clapping. Then stretch it out even, and pin it to dry on a linen cloth, making the edge as straight as possible, opening out all the scallops, and fastening each with pins. When dry, lay a piece of thin muslin smoothly over it, and iron it on the wrong side.

VEILS (Black Tissue), To Renew.—Dip them in thin glue water; shake them gently until

nearly dry; spread black silk or cambric on the ironing blanket, and press with a moderate iron.

VELVET, To take Grease out of.—To take grease out of velvet or cloth, get some turpentine and pour it over the place that is greasy; rub it till quite dry with a piece of clean flannel; if the grease be not removed, repeat the application, and when done, brush the place well; and hang up the garment in the open air in order to take away the smell.

VELVET, To Restore.—Cover a hot smoothing iron with a wet cloth, and hold the velvet firmly over it. The vapor arising will raise the pile of the velvet with the assistance of a light whisk.

VIOLET DYE.—This, like purple, is produced by a mixture of red and blue coloring matter, applied either together, or in succession. A good violet may be given to silk or wool by passing it first through a solution of verdigris, then through a decoction of logwood, and lastly through alum water. A fast violet may be given by dyeing the goods a crimson with cochineal, without alum or tartar, and, after rinsing, passing them through the indigo vat.—Linen or cottons are first galled with 18% of gall nuts, next passed through a mixed mordant of alum, iron liquor, and sulphate of copper, working them well, then worked in a madder bath made with an equal weight of root, and lastly brightened with soap or soda. Another good method is to pass cloth dyed Turkey red through the blue vat.—Wool, silk, cotton, or linen, mordanted with alum and dyed in a logwood bath, or a mixed bath of Archil and Brazil, also takes a pretty, but false violet.

WASHING, Hints on.—The linen for Monday's wash should be collected on Saturday, sorted and put to soak in cold water according to the various kinds. The body linen should be put into one tub, the bed and table linen in another, and the fine things separately. Plain collars, cuffs, wristbands, should be strung through the button holes on a piece of bobbin long enough to enable the articles to be easily divided for rubbing, starching, etc. Colored muslins, prints, and flannels must be laid aside to be washed in a different manner from white calico or linen. Properly boiled suds are far better than soap for washing, particularly if a washing machine be employed. The suds should be prepared in the following manner:—Shred into an earthenware jar the best yellow soap cut into very fine shavings, and pour boiling water to the quantity required. One pound of soap is plenty for one gallon of water. Add to this quantity half a pound of the best soda, and set the jar (covered) on a stove or at the back of the kitchen range till the soap is quite dissolved. If this be done on Saturday evening, the soap will be a smooth jelly fit to use on Monday morning.

WASHING FLUIDS.—1. Take one pound of sal soda and half a pound of unslaked lime, put them into a gallon of water and boil twenty minutes; let it stand till cool, then drain off and put into a strong jar or jug; soak your dirty clothes over night, or until they are wet through, then wring them out and rub on plenty of soap, and in one boiler of clothes, well covered with water, add one teacupful of washing fluid; boil half an hour briskly, and then wash them thoroughly through one suds, rinse, and your clothes

will look better than the old way of washing twice before boiling.

2. Five pounds of sal soda, one pound of borax, one pound of unslaked lime. Dissolve the soda and borax in one gallon of boiling water; slake the lime in the same quantity of boiling water; then pour them both into eight gallons of cold water; stir a few times and let it stand until morning, when the clear fluid should be poured off into jars, ready for use. For two pails full of water use half a pint of the compound. Soak your clothes over night, putting soap on the soiled parts. In the morning wring them out and put them on to boil, first putting some of the fluid and soap into the boiler. After boiling ten or twelve minutes, take them out into your machine or tub and the dirt will rub right off; then rinse well in two waters.

3. One and one quarter pound of washing soda, $\frac{1}{4}$ pound borax, and dissolve in 4 quarts water by boiling. When the mixture is cold add about one half a teacupful of water of ammonia (harts-horn), and bottle for use, taking care to keep the fluid corked from the air. For use take a cupful to a pailful of water.

4. Sal soda and borax, $\frac{1}{4}$ lb. each; gum camphor, 1 oz.; alcohol, $\frac{1}{2}$ pint. Dissolve the soda and borax in one gallon of boiling rain water, pour in two gallons of cold rain water, add the camphor first dissolved in the alcohol, stir well and bottle for use. Four tablespoonfuls of the preparation are to be mixed with a pint of soft soap, and the clothes boiled in a suds made of this. It is all the better if the clothes are soaked over night, before putting them into the suds.

5. Soak your clothes over night in clear, cold water; in the morning have over the fire what water is necessary to boil them in, add one tablespoonful of saleratus, one pint of soft soap, or one quarter of a bar of hard soap, wring or drain your clothes from the water in which they have stood over night, put them in your boiler, boil three quarters of an hour, when they will need but little rubbing, rinse, and your clothes will be beautifully white. Your suds will be excellent for washing colored clothing of all kinds, as it does not injure the nicest prints. One pound of saleratus will do twenty washings for any common family.

WHITE DYE for Silk.—The silk is treated, first of all, with soap, taking one quarter of a pound to one pound of silk, boiled an hour in a fresh soap solution, containing one and a half ounces in the pound, taken through cold water, and next sulphured. The sulphuring is repeated three times, and after each time the silk is steamed at a temperature of 88–100° F. After the last sulphuring the silk is steamed several times till the sulphurous smell has entirely disappeared. The silk is now washed twice in pure running or soft (rain) water, passed into a strong, boiling soap bath, drawn five times through the same, wrung out, prepared, and dyed white, according to pattern, in a fresh boiling bath of soap, to which a little reddish aniline blue, soluble in alcohol, has been added. The silk thus dyed white is washed twice more, and then drawn five times through a cold vinegar (acetic acid) bath. It is then finished.

If the white has turned out too blue, some ammoniacal cochineal is added to the vinegar bath.

By this process every kind of white can be obtained—pure white, milk white, bluish white, or reddish white.

WINE COLOR DYE for Wool.—For 5 lbs. goods—camwood 2 lbs.; boil 15 minutes and dip the goods $\frac{1}{2}$ hour; boil again and dip $\frac{1}{2}$ hour; then darken with blue vitriol $1\frac{1}{2}$ oz.; if not dark enough, add copperas $\frac{1}{4}$ oz.

WOOLEN ARTICLES, To Clean.—The shrinking and discoloring of woollen articles may be, in great part, prevented by care in washing them. Never wash them in hard water, nor water softened by soda; nor should they be rubbed with soap. The fibers of wool are covered with little points, all directed one way. As the woolen is rubbed, these become tangled, and form a kind of thick felt, by which means the article is shrunk and thickened. For the same reason it is not desirable to wring woollen things. Before washing, woollen things should be well brushed and shaken to get rid of the dust. Rain, or soft river water, should have a strong lather made in it with soap; or, if the things are very greasy, oxgall should be added, in the proportion of half a pint to six quarts of water; then boiling water should be added to the lather to make it as hot as it is possible to bear the hand in; and the dirty woolen should be put in, and dipped and raised repeatedly for several minutes. It should then be squeezed (not wrung) as dry as possible from the dirty, slimy liquor, and the process, if necessary, repeated with some clean lather. If the article is not very dirty, and becomes quite clean in the first washing, the second washing may be in hot water only, without soap; and, in either case, a blue-bag should be used in the last water. When gall has been used, a third water is necessary to take off the bad smell. When the article is finished, it should be squeezed as dry as can be, and dried as quickly as possible in the open air, if the weather is fine.

WOOL, To Cleanse.—Make a liquid of water 3 parts and urine 1 part; heat it as hot as you can bear the hand in it; then put in the wool, a little at a time, so as not to have it crowd; let it remain in for 15 minutes; take it out over a basket to drain; then rinse in running water, and spread it out to dry; thus proceed in the same liquor; when it gets reduced fill it up, in the same proportions, keeping it at hand heat, all the time not using any soap.

YELLOW DYE for Cotton.—1st. Clean the cloth or goods by steeping in soap-suds, then rinse in several different messes of clean water, and lay aside moist.

2d. Into a clean brass, copper, or wooden vessel put the amount of clean warm water deemed necessary to work the goods in easily, then add the acetate of lead (previously dissolved in a little hot water in a basin or kettle), and stir with a wooden rod till well mixed; after which put in the cloth or goods, and let them lie in 30 minutes or longer, stirring often.

3d. Into another clean earthen, wooden, or metallic vessel put the amount of clean warm water deemed requisite to work the goods in easily, then add the bichromate of potash (previously dissolved in a little hot water in a brass or iron kettle), and stir with a clean wooden rod till well mixed; after which wring out the goods evenly from the acetate of lead bath and work them in this bichromate of potash bath fifteen minutes or longer, then wring out, rinse in sev-

eral different messes of clean water, and dry in the shade or in sunshine.

If the color is not even or full after one round of dippings, repeat the dippings in both baths, in the order above described, till the color is even and satisfactory.

A single pound of cotton goods requires about four gallons of water in each bath to work it in easily. Larger quantities of these goods do not need quite so much water in proportion.

YELLOW DYES for Cotton.—1. For three pounds of goods, dissolve in six quarts of soft water, six ounces of sugar of lead; dissolve three ounces of the bichromate of potash in another vessel and dip the goods, one piece at a time, into the sugar of lead and then into the bichromate; dry and rinse, and it is done.

2. For 5 lbs. of goods—sugar of lead 7 oz.; dip the goods two hours; make a new dye with bichromate of potash 4 oz.; dip until the color

suits, wring out and dry; if not yellow enough, repeat the operation.

3. The following substances impart a yellow to goods, either at once, or after they have been mordanted with alumina or tin:—*annatto, dyer's broom, fustic, fustet, French berries, quercitron bark, turmeric, barberry root.* Goods mordanted with acetate of lead, and afterwards passed through a bath of chromate of potash, acquire a brilliant *chrome yellow* color; solution of sulphate or acetate of iron, followed by immersion in potash or lime-water, gives a *yellow, buff, or orange*.—*orpiment* dissolved in ammonia imparts a golden yellow.

YELLOW DYE for Silk.—For one pound of silk—alum 3 oz.; sugar of lead $\frac{3}{4}$ oz.; immerse the goods in the solution over night; take out, drain, and make a new dye with fustic one pound; dip until the required color is obtained.

WINES, LIQUORS AND VINEGAR.

***ACID, Royal Strawberry.**—Take 3 pounds of ripe strawberries, 2 ounces of citric acid, and 1 quart of spring water. Dissolve the acid in the water, and pour it on the strawberries, and let them stand in a cool place 24 hours. Then drain the liquid off, and pour it on 3 more pounds of fruit; let it stand 24 hours. Add to the liquid its own weight of sugar; boil it 3 or 4 minutes in a porcelain-lined preserve kettle, lest metal may affect the taste, and, when cool, cork it in bottles lightly for 3 days, then tightly, and seal them. Keep in a dry and cool place. It is delicious for sick and well.

ADULTERATION of Wine and Liquors.—We have given considerable time to the investigation of this question, and have come to the conclusion that it is next to impossible to obtain here real Sherry and Port wine, and very difficult to obtain real Brandy. The cheaper liquors, such as Whisky, Gin, Apple Jack, Brandy, and others are all made from high wines, and sometimes even low wines are employed for this purpose. They are mixtures of alcohol, water, and ethers, which, according to the process of fermentation, distillation, and the materials employed, are of different composition and quality, thereby characterizing the different liquors. They are colored by either sugar coloring or extract of logwood. The fusel oil is the most objectionable, in fact highly poisonous, constituent of these liquors, and ought to be removed as far as possible without destroying or removing the compound ethers of it. This is accomplished by filtering through charcoal, or by distilling for very high graded wine. We are aware, however, that it lies principally with the distiller himself, in selecting the materials and conducting the fermentation properly, to avoid the formation of an undue amount of fusel oil. The quality of these liquors may be tested in the following way:—A certain volume is subjected to distillation in a retort, connected with a Liebig's cooler to condense the alcohol. After three-

fourths of the liquid are distilled over, remove the flame; fill up the alcohol to the volume originally taken, and note the specific gravity, from which may be calculated the percentage of spirit; the residue in the retort is tested for taste and odor, whereby the nature of the coloring material and the adulteration with pepper or other sharp-tasting spice is detected. The alcohol is tested for fusel oil. The percentage of alcohol in whiskeys and gins is from 45 to 50, that of brandy, from 50 to 65. The residue from brandy will always contain some tannic acid, derived from the oaken casks in which it is exported. This is easily detected by a salt of iron giving the greenish blue color of ink. This same plan is followed in the analysis of wines, where the residue alone will be a criterion of the quality of the wine. All wines contain tartaric acid in some shape, which, however, is generally supplied in manufactured wine, so that its presence cannot be taken as a proof of the genuineness of the wine. We can give you at present no sure test for establishing the difference between natural color and artificial coloring, though many have been published from time to time. This is a question which must be decided by the experience of the analyst.

ALCOHOL.—Proof spirit, which is the standard by which all mixtures of alcohol and water are judged, contains 50 per cent. by volume and 42-52 per cent. by weight of alcohol. The specific gravity of proof spirit is 0.933; and, when a spirit is "above proof," it denotes that it contains an excess of alcohol. Thus if 100 volumes of a spirit require 20 volumes of water to reduce it to "proof standard," it is said to be 20 over proof, while the term "under proof" has reference to a less strong spirit than the standard. Thus, if 100 volumes of a spirit require 20 volumes of spirit of a specific gravity of 0.825 to raise it to the "proof" standard, the sample is said to be "20 under proof." The strength is ascertained by the hydrometer.

Alcohol, when thoroughly rectified and cleansed, is called pure neutral spirit, and is the basis of all the domestic manufactured imitations of foreign brandies, gins, cordials, etc. The high wine, or neutral spirit, distilled and rectified, and sold as French pure spirit, is free from all deleterious substances, and when sweetened, colored, and properly flavored, will compete favorably with imported brandy or gin. Good strong whisky may be used as a substitute for the above proof spirit, but it is inferior to the other. The whisky should be of proper strength, and treated as follows; this process destroys the fusel oil, and precipitates the verdigris to the bottom:—

To 40 gals. whisky, add $1\frac{1}{2}$ lbs. unslaked lime; $\frac{1}{4}$ lb. powdered alum; and $\frac{1}{2}$ pt. spirits of nitre; stir well, and let stand twenty-four hours. Then draw off into another cask, avoiding the sediment. It is then fit for use. All oils used must be cut in 90 per cent. alcohol, using 1 qt. alcohol to 2 oz. oil, and should stand twenty-four hours before using.

ALE, To Brew.—The various operations of brewing are nearly the same for every species of malt liquor, the differences in the products arising from the materials employed, the heat of the water used for mashing, and the temperature at which the fermentation is conducted. (See Brewing.) For ale, pale or lightly dried malt should be chosen, as well as pale hops, if it be desired to brew a liquor possessing but little color; and the fermentation should be carried on at a low temperature. Almost every county in England has its variety of ale, but the difference consists chiefly (the same quantity of malt and hops being used) in the preparation of the malt. The water may in some cases vary in quality, the boiling may be longer or shorter, or the liquor may be turned on at a different heat; but these circumstances being considered, one general process serves for the whole, as before observed. For immediate use, the malt may be all pale; but if brewed for keeping, or in warm weather, one-fourth should be amber malt. 6 lbs. of Kent hops should be used to the quarter, or 8 to 10 lbs. for keeping ale.

ALE, Burton.—This is a strong species of ale, of which only a barrel and a half is drawn from a quarter of malt. Temperature for the first mash 170° , and for the second 180° , followed by a mash for table beer at 165° . It is tunned at 58° , and cleansed at 72° . The finest pale malt, ground two days before using, together with the best Kent hops, (6 to 8 lbs. per quarter,) are employed for this ale.

ALE for Private Families.—A bushel and three quarters of ground malt and a pound of hops are sufficient to make 18 gallons of good family ale. That the saccharine matter of the malt may be extracted by infusion, without the farina, the temperature of the water should not exceed 165° or 170° Fahrenheit's thermometer. The quantity of water should be divided into two portions, one of which should be poured upon the malt as speedily as possible, and the whole being well mixed together by active stirring, the vessel should be closely covered over for an hour; if the weather be cold, for an hour and a half. If hard water be employed, it should be boiled, and the temperature allowed, by exposure to the atmosphere, to fall to about 165° Fahr.; but if rain water is used, it may be added to the malt

as soon as it reaches the point. After standing the proper time, the wort must be drawn off into another vessel, and the second portion of the water poured on, which should be allowed to mash an hour. The first wort may then be boiled with $\frac{1}{2}$ lb. of hops for one hour, by which time the second mashing will be ready to be drawn off, and should be boiled for half an hour, with $\frac{1}{4}$ lb. of fresh hops. The two liquors should now be mixed and cooled down to the temperature of 60° or 65° , when a pint of good thick yeast should be well stirred in, and as soon as the fermentation is completed, the liquor may be drawn off into a clean cask previously rinsed with boiling water. When the slow fermentation which will ensue has ceased, the cask should be loosely bunged for two days, after which, if the liquor be left quiet, the bung may be properly fastened. Pale malt is the best, because, when highly dried, it does not afford so much saccharine matter. If the malt be new, it should be exposed to the air, in a dry room, for two days previously to its being used. A third mashing may be made for table beer.

ALE, Home Brewed.—For this purpose a quarter of malt, (8 bus.) is obtained at the malt house—or, if wished to be extra strong, nine bushels of malt—are taken, with hops, 12 lbs.; yeast, 5 qts.

The malt, being crushed or ground, is mixed with 72 gals. of water at the temperature of 160° , and covered up for 3 hours, when 40 gallons are drawn off, into which the hops are put, and left to infuse. Sixty gallons of water at a temperature of 170° are then added to the malt in the mash-tub, and well mixed, and after standing 2 hours, sixty gallons are drawn off. The wort from these two mashes is boiled with the hops for 2 hours, and after being cooled down to 65° , is strained through a flannel bag into a fermenting tub, where it is mixed with the yeast and left to work for 24 or 30 hours. It is then run into barrels to cleanse, a few gallons being reserved for filling up the casks as the yeast works over.

ARRACK PUNCH SYRUP.— $53\frac{1}{2}$ lbs. sugar; $3\frac{1}{2}$ gals. water. Boil up well; then add $1\frac{1}{2}$ gals. lemon juice to the boiling sugar, and stir till the liquid is clear; pour it in a clean tub, and, when nearly cool, add 5 gals. Batavia arrack; then filter.

ARRACK, BATAVIA.—To 12 gallons pale rum, add 2 ounces flowers of benzoin; $\frac{1}{2}$ ounce balsam of Tolu; 1 ounce sliced pine apple. Digest with occasional agitation for a month; then add $\frac{1}{2}$ pint raw milk agitated well for fifteen minutes, and rack in a week; a fine imitation.

BARRELS, To Sweeten when Foul.—1. Set fire to 1 lb. or more of broken charcoal, put it into the cask, and immediately fill up the cask with boiling water. After this roll the cask once or twice a day for a week; then pour out the charcoal and water, wash out the cask with clean cold water, and expose it to the external air for some days. — 2. A pint of the permanganate turned into the most musty, filthy cider or beer cask and rinsed about a few moments will entirely decompose all fungoid growths and fermenting matter, and render the cask as sweet as those that are new. The deodorizing, disinfecting power of the permanganate, holding, as it does, five equivalents of oxygen, is wonderful; it will even deodorize carbolic acid.

BEAD for Liquors.—The best bead is the

orange-flower water bead, (oil of neroli), 1 drop to each gallon of brandy. *Another method.*—To every 40 drops of sulphuric acid, add 60 drops purest sweet oil in a glass vessel; use immediately. This quantity is generally sufficient for 10 gallons spirit. *Another.*—Take 1 ounce of the purest oil sweet almonds; 1 ounce of sulphuric acid; put them in a stone mortar; add, by degrees, 2 ounces white lump sugar, rubbing it well with the pestle till it becomes a paste; then add small quantities of spirits of wine till it comes into a liquid. This quantity is sufficient for 100 gallons. The first is strongly recommended as the best.

BEER, To give the Appearance of Age to.—Add a few handfuls of pickled cucumbers and Seville oranges, both chopped up. This is said to make malt liquor appear six months older than it really is.

BEER BOUQUET.—According to Dr. Boettger, this liquor consists of a solution of the essential oil of lemons in light petroleum oil, and a coarse fusel oil, containing spirit colored by turmeric.

BEER, CHEAP.—1. Water 15 gals.; boil half the water with $\frac{1}{4}$ lb. hops; then add to the other half in the tun, and well mix with 1 gal. molasses and a little yeast.—2. Fill a boiler with the green shells of peas, pour on water till it rises half an inch above the shells, and simmer for three hours. Strain off the liquor, and add a strong decoction of the wood sage, or the hop, so as to render it pleasantly bitter, then ferment in the usual manner. The wood sage is the best substitute for hops, and being free from any anodyne property is entitled to a preference. By boiling a fresh quantity of shells in the decoction before it becomes cold, it may be so thoroughly impregnated with saccharine matter, as to afford a liquor, when fermented, as strong as ale.

BEER CUP.—Put a quarter of an ounce of cinnamon, two cloves, one allspice; a little grated nutmeg, and one gill of sherry into a jug; let it stand for two hours, then add two pints of best Burton ale and four bottles of good ginger beer; ice with blocks of clear ice.

BEER, To Enliven and Restore when Dead.—Boil some water and sugar, or water and treacle, together, and when cold add some new yeast; this will restore dead beer, or ripen bottled beer in 24 hours; and it will also make worts work in the tun if they are sluggish.

Or, a small teaspoonful of carbonate of soda may be mixed with a quart of it as it is drawn for drinking.

Or, boil for every gallon of the liquor 3 oz. of sugar in water; when cold add a little yeast, and put the fermenting mixture into the flat beer, whether it be a full cask or the bottom of the cask.

Or, beer may often be restored which has become flat or stale, by rolling and shaking the cask for a considerable time, which will create such a new fermentation as to render it necessary to open a vent-peg to prevent the cask from bursting.

BEER, Fining and Preserving.—Take a handful of the hops boiled in the first wort, and dried; $\frac{1}{2}$ lb. of loaf sugar dissolved in the beer; 1 lb. of chalk; and $\frac{1}{2}$ lb. of calcined oyster shells. Put the whole in at the bung hole, stirring them well and then rebunging. This preparation will also suit for racked beer; in put-

ting in the hops it may be advisable to place them in a net with a small stone in the bottom so as to sink them, otherwise they will swim at the top.

BEER, To Improve the Flavor of.—Bruise ginger, 1 oz.; bruise cloves, $\frac{1}{2}$ oz.; a few scalded hops and a doz. broken coarse biscuits to every two barrels. Rummage well.

BEER, GINGER.—1. Ten pounds of sugar; 9 ounces of lemon juice; $\frac{1}{2}$ a pound of honey; 11 ounces of bruised ginger root; 9 gallons of water; 3 pints of yeast. Boil the ginger half an hour in a gallon of water; then add the rest of the water and the other ingredients, and strain it when cold. Add the white of an egg, beaten, and $\frac{1}{2}$ an ounce of essence of lemon. Let it stand 4 days, then bottle, and it will keep many months.

2. Three gallons of cold spring water, one quart of molasses, one tablespoon of cream of tartar, three tablespoons of ginger, one quart of yeast; mix together in a tub, and stand for five hours. It may then be bottled, and will be fit for use in one day.

3. White sugar 5 lbs.; lemon juice 1 gill; honey $\frac{1}{4}$ lb.; ginger, bruised, 5 oz.; water $4\frac{1}{2}$ gals. Boil the ginger thirty minutes in three qts. of the water; then add the other ingredients, and strain; when cold, put in the white of an egg, well beaten, with one teaspoon of lemon essence—let stand four days, and bottle. It will keep for months—much longer than if yeast was used; the honey, however, operates mildly in place of yeast.

4. Put two gallons of cold water in a pot upon the fire; add to it two ounces of good ginger bruised, and two pounds of white or brown sugar. Let this come to a boil, and continue boiling for about half an hour. Then skim the liquor and pour into a jar or tub, along with one sliced lemon and half an ounce of cream of tartar. When nearly cold put in a teaspoonful of yeast, to cause the whole to work. The beer is now made; and after it has worked for two days, strain it and bottle it for use. Tie down the corks firmly.

5. To two pounds of white sugar, two ounces of best Jamaica ginger, well bruised, two ounces of cream of tartar, and the rind of two lemons, add two gallons of boiling water; stir all together till they become lukewarm, toast a slice of bread, pour on it two tablespoonfuls of good fresh yeast, and place it to float on the top of the mixture; cover the whole up for twenty-four hours, then strain and bottle it, taking care not to fill the bottles; cork and wire it securely. This quantity will make three dozen bottles, and will be ready for use in three or four days.

BEER POWDERS, GINGER.—1. Take 2 drs. of fine loaf sugar, 8 grs. of ginger, 26 grs. of carbonate of potassa, all in fine powder; mix them intimately in a Wedgwood's ware mortar. Take also 27 grs. of citric or tartaric acid (the first is the pleasantest, but the last is the cheapest). The acid is to be kept separate from the mixture. The beer is prepared from the powders thus: Take two tumbler-glasses, each half filled with water; stir up the compound powder in one of them, and the acid powder in another, then mix the two liquors; an effervescence takes place, the beer is prepared, and may be drunk off. The effervescence is occasioned by the discharge of the carbonic acid of the carbonate of

potassa. If the beer is allowed to stand for a few minutes it becomes flat; this is owing to its having lost all its carbonic acid. The cost of these powders is 20 cts. a dozen sets.—2. (*With Soda Powders.*) Put into blue papers, 30 grains to each paper, of bicarbonate of soda, 5 grains of powdered ginger, and 1 drachm of white powdered sugar. Put into white papers, 25 grains, to each, of powdered tartaric acid. Put 1 paper of a kind to $\frac{1}{2}$ a pint of water. The common soda powders of the shops are like the above, with the sugar and ginger omitted.

BEER, HOP.—Turn 5 quarts of water on 6 ounces of hops; boil three hours; strain off the liquor; turn on 4 quarts more of water, and 12 spoonfuls of ginger, and boil the hops 3 hours longer; strain and mix it with the other liquor, and stir in 2 quarts of molasses. Brown, very dry, half a pound of bread, and put in—rusked bread is best. Pound it fine, and brown it in a pot, like coffee. After cooling to be about lukewarm, add a pint of new yeast that is free from salt. Keep the beer covered, in a temperate situation, till fermentation has ceased, which is known by the settling of the froth; then turn it into a keg or bottles, and keep it in a cool place.

BEER, LEMON.—To a gallon of water add a sliced lemon, a spoonful of ginger, $\frac{1}{2}$ a pint of yeast, and sugar enough to make it quite sweet.

BEER, MAPLE.—To 4 gallons of boiling water add 1 quart of maple syrup, and half an ounce of essence of spruce; add one pint of yeast and proceed as with ginger pop.

BEER, MOLASSES.—Hops 1 oz.; water 1 gal.; boil for 10 minutes, strain, add molasses 1 lb., and when lukewarm, yeast, 1 spoonful. Ferment.

BEER, To Restore when Musty.—Run it through some hops that have been boiled in strong wort, and afterwards work it with double the quantity of new malt liquor; or if the fault is in the cask, draw it off into a sweet cask, and having boiled $\frac{1}{2}$ lb. of brown sugar in 1 quart of water, add 1 or 2 spoonfuls of yeast before it is quite cold, and when the mixture ferments, pour it into the cask.

BEER, PHILADELPHIA.—Water 30 gallons; brown sugar 20 lbs.; ginger, bruised, 1 $\frac{1}{4}$ lb.; cream of tartar $\frac{1}{4}$ lb.; supercarbonate of soda 3 oz.; oil of lemon, cut in a little alcohol, 1 teaspoon; whites of 10 eggs, well beaten; hops 2 oz.; yeast 1 quart.

The ginger root and hops should be boiled 20 or 30 minutes in enough of the water to make all milk warm, then strained into the rest, and the yeast added and allowed to work over night; skimmed and bottled.

BEER, ROOT.—1. Take 3 gals. of molasses; add 10 gals. of water at 60° Fah. Let this stand 2 hours, then pour into a barrel, and add powdered or bruised sassafras and wintergreen bark, each $\frac{1}{2}$ lb., bruised sarsaparilla root $\frac{1}{2}$ lb., yeast one pint, water enough to fill the barrel, say 25 gals. Ferment for 12 hours and bottle.

2. For 10 gals. beer, take 3 lbs. common burdock root, or 1 ounce essence of sassafras; $\frac{1}{2}$ lb. good hops; 1 pint corn, roasted brown. Boil the whole in 6 gals. pure water until the strength of the materials is obtained; strain while hot into a keg, adding enough cold water to make 10 gals. When nearly cold, add clean molasses or

syrup until palatable,—not sickish sweet. Add also as much fresh yeast as will raise a batch of 8 loaves of bread. Place the keg in a cellar or other cool place, and in 48 hours you will have a keg of first-rate sparkling root beer.

3. For each gallon of water to be used, take hops, burdock, yellow dock, sarsaparilla, dandelion, and spikenard roots, bruised, of each $\frac{1}{2}$ ounce; boil about 20 minutes, and strain while hot, add 8 or 10 drops of oils of spruce and sassafras, mixed in equal proportions, when cool enough not to scald your hand, put in 2 or 3 tablespoons of yeast; molasses, $\frac{1}{8}$ of a pint, or white sugar $\frac{1}{2}$ lb., gives it about the right sweetness.

4. American sarsaparilla, 2 pounds; spice wood, $\frac{1}{2}$ pound; guaiac chips, 1 pound; birch bark, $\frac{1}{4}$ pound; ginger, $\frac{1}{2}$ ounce; sassafras, 4 ounces; prickly ash bark, $\frac{1}{2}$ ounce; white mustard, 1 ounce; hops, 1 ounce. Boil for twelve hours at a moderate heat, with sufficient water, so that the remainder shall measure five gallons, to which add of tincture of ginger, 8 ounces; oil of wintergreen, 1 ounce; alcohol, 1 quart; or sufficient to prevent fermentation.

To make Root Beer, take of the above decoction, 1 quart; molasses, 8 ounces; water 2 $\frac{1}{2}$ gallons; yeast, 4 ounces.

The Root Beer, in warm weather, should be mixed the evening before it is used. It can be kept for use either bottled or drawn by a common beer pump. Most people prefer a small addition of wild cherry bitters or hot drops to the above beer.

BEER, To Cure when Ropy.—Put a handful or two of flour, and the same quantity of hops, with a little powdered alum, into the beer, and rummage it well.

BEER, SASSAFRAS.—Have ready 2 gals. of soft water; one quart of wheat bran; a large handful of dried apples; half a pint of molasses; a small handful of hops; half a pint of strong fresh yeast, and a piece of sassafras root the size of an egg. Put all the ingredients (save molasses and yeast) at once in a large kettle. Boil until the apples are quite soft. Pour the molasses in a small, clean tub or a large pan. Set a hair sieve over the vessel and strain the mixture through it. Let it stand until it becomes only milk warm, when stir in the yeast, put the liquor immediately into the keg or jugs, and let it stand, uncorked, to ferment. Fill the jugs quite full, that the liquor in fermentation may run over. Set them in a large tub. When the fermentation has subsided, cork, and use next day. 2 large tablespoons of ginger, stirred into the molasses, will be found to be an improvement. If the yeast is stirred in while the liquor is too warm, it will be apt to turn sour. If the liquor is not at once put into jugs, it will not ferment well. Keep in a cool place. This beer is only for present use, as it will not keep more than 2 days in very warm weather.

BEER, SOLID.—By a very simple process, introduced by Mr. Mertens, the wort, after being made in the mash-tub of malt and hops, in the usual manner, is sucked up by a pipe into a large vacuum (exhausted by an air-pump), and then persistently worked round and round, while the moisture is evaporated. The wort emerges from its tribulations with a pasty consistence, and is allowed to fall from a considerable height into air-tight boxes, in which it reposes like hard-

bake. It soon gets so exceedingly tough that it has to be broken up with a chisel and mallet, and in that condition is easily sent abroad, or to any part of the world, for people to brew their own malt liquor.

BEER, To Restore when Sour.—Good hops $\frac{3}{4}$ lb., powdered chalk 2 lbs.; put in the hole of the cask, and bung close for a few days; for frosted beer, add some finings, a few handfuls of flour, and some scalded hops; for rosy beer, use a handful or two of flour, the same of hops, with a little powdered alum to each barrel. Rummage well.

BEER, SPRUCE.—1. Boil a handful of hops, and 2 of the chips of sassafras root, in 10 gallons of water; strain it, and turn on, while hot, a gallon of molasses, 2 spoonfuls of the essence of spruce, 2 spoonfuls of ginger, and 1 of pounded allspice. Put it into a cask; and when cold enough, add half a pint of good yeast; stir it well; stop it close; when clear, bottle and cork it.

2. For 3 gals. water put in 1 qt. and $\frac{1}{2}$ pt. of molasses, 3 eggs well beaten, yeast 1 gill. Into 2 qts. of the water boiling hot put 50 drops of any oil you wish the flavor of; or mix 1 oz. each, oils sassafras, spruce and wintergreen, then use 50 drops of the mixed oils.

3. Boil 8 gals. of water, and when in a state of complete ebullition pour it into a beer barrel which contains 8 gals. more of cold water; then add 16 lbs. of molasses, with a few tablespoonfuls of the essence of spruce, stirring the whole well together; add half a pint of yeast, and keep it in a temperate situation, with the bung-hole open for two days till the fermentation be abated, when the bung may be put in and the beer bottled off. It is fit to drink in a day or two. If you can get no essence of spruce make a strong decoction of the small twigs and leaves of the spruce fir.

4. Take of the essence of spruce half a pint; bruised pimento and ginger, of each four ounces; water, three gallons. Boil five or ten minutes, then strain and add 11 gallons of warm water, a pint of yeast, and six pints of molasses. Allow the mixture to ferment for 24 hours.

5. Take of oil of spruce, sassafras, and wintergreen, each 40 drops; pour 1 gal. of boiling water on the oils, then add 4 gals. of cold water, 3 pints of molasses, 1 pint of yeast. Let it stand for 2 hours and bottle.

BEER POWDERS, SPRUCE.—White sugar, 1 drachm; bicarbonate of soda, 1 scruple; essence of spruce, 8 grains; essence of lemon, 1 grain. Mix and wrap it in blue paper. Then add tartaric acid, $\frac{1}{2}$ drachm, and wrap it in white paper. For use: dissolve each paper in separate glasses, one third full of water, pour one into the other, and drink immediately.

BEER, Improved STRONG.—Malt, 1 peck; coarse brown sugar, 6 pounds; hops, 4 ounces; good yeast, 1 teacup; if you have not malt, take a little over 1 peck of barley, (twice the amount of oats will do, but are not as good,) and put it into an oven after the bread is drawn, or into a stove oven, and steam the moisture from them. Grind coarsely. Now pour upon the ground malt $3\frac{1}{2}$ gallons of water at 170 or 172° of heat. The tub in which you scald the malt should have a false bottom, 2 or 3 inches from the real bottom; the false bottom should be bored full of gimlet holes, so as to act as a strainer, to keep back the malt meal. When the water is poured

on, stir them well, and let it stand 3 hours, and draw off by a faucet; put in 7 gallons more of water at 180 to 182° ; stir it well, and let it stand 2 hours and draw it off. Then put on a gallon or two of cold water, stir it well and draw it off; you should have about 5 or 6 gallons. Put the 6 pounds of coarse brown sugar in an equal amount of water; mix with the wort, and boil $1\frac{1}{2}$ to 2 hours with the hops; you should have eight gallons when boiled; when cooled to 80° put in the yeast, and let it work 18 to 20 hours, covered with a sack; use sound iron hooped kegs or porter bottles, bung or cork tight, and in two weeks it will be good sound beer, and will keep a long time; and for persons of a weak habit of body, and especially females, 1 glass of this with their meals is far better than tea or coffee, or all the ardent spirits in the universe. If more malt is used; not exceeding $\frac{1}{2}$ a bushel, the beer, of course, would have more spirit, but this strength is sufficient for the use of families or invalids.

BEER, TOMATO.—Gather the fruit once a week, stem, wash and mash it; strain through a coarse linen bag, and to every gallon of the juice add a pound of good, moist brown sugar. Let it stand nine days, and then pour it off from the pulp, which will settle in the bottom of the jar. Bottle it closely, and the longer you keep it the better it is when you want to use it. Take a pitcher that will hold as much as you want to use—for my family I use a gallon pitcher—fill it nearly full of fresh sweetened water, add some of the preparation already described, and a few drops of essence of lemon, and you will find it equal to the best lemonade, costing almost nothing. To every gallon of sweetened water I add a half tumbler of beer.

BITTERS, STOMACH.—European Gentian root, $1\frac{1}{2}$ ounce; orange peel, $2\frac{1}{2}$ ounces; cinnamon, $\frac{1}{4}$ ounce; anise seed, $\frac{1}{2}$ ounce; coriander seed, $\frac{1}{2}$ ounce; cardamom seed, $\frac{1}{4}$ ounce; unground Peruvian bark, $\frac{1}{2}$ ounce; gum kino, $\frac{1}{4}$ ounce; bruise all these articles, and put them into the best alcohol, 1 pint; let it stand a week and pour off the clear tincture; then boil the dregs a few minutes in 1 quart of water, strain, and press out all the strength; now dissolve loaf sugar, 1 pound, in the hot liquid, adding 3 quarts cold water, and mix with spirit tincture first poured off, or you can add these, and let it stand on the dregs if preferred.

BITTERS, BRANDY.—Bruised gentian, 8 ounces; orange peel, 5 ounces; cardamoms, 3 ounces; cassia, 1 ounce; cochineal, $\frac{1}{4}$ ounce; spirit, 1 gallon. Digest for one week, then decant the clear, and pour on the dregs, water, 5 pints. Digest for one week longer, decant, and mix the two tinctures together.

BOTTLES, To Sweeten when Musty.—Sweeten with sulphuric acid and water mixed in the proportion of a quart of water to half a pint of acid.

BOTTLES, Wax for.—Take one pound of resin, one pound of beeswax, and half a pound of tallow. Mix these with red or yellow ochre, soot, or Spanish whiting, according to the color you require. Melt the whole carefully, stirring it all the time. If it be likely to boil over, stir it with a candle end, which will allay the violence of the ebullition. (See also Page 40.)

BOTTLES, Sealing Compound for.—Gelatin mixed with glycerine yields a compound liquid when hot, but becoming solid by cooling, at the

same time retaining much of the elasticity. Bottles may be hermetically sealed by dipping their necks into the liquid mixture, and repeating the operation until the cap attains any thickness required.

BOTTLING MALT LIQUORS.—There can be no doubt that all fermented malt liquors, as well as wine, are improved by bottling, when the work is performed with sufficient skill and care; but there are several considerations requisite to success which we shall now bring under the notice of our readers.

The state of the liquor at the time of bottling. The fermentation of the liquor should be nearly completed; if not, there will be the risk of bursting the bottles in consequence of the generation of too large a quantity of gas. On the other hand, if the fermentation be over and the liquor be flat, the beer will become more or less sour. The mode of judging as to the fitness of the liquor for bottling is to ascertain its condition in the cask. If, on drawing the vent-peg, the liquor spurts out with violence, it is certain that the process of fermentation is still going on; on the other hand, if it appears to be still, and on being tasted is in good condition and brisk, it may be held to be in a fit state for bottling. If, however, it be too brisk and frothy while bottling, the bottles ought to be left uncorked for a few hours, and filled out. They should only be filled up as the froth works within an inch of the cork.

BOTTLING, Corks for.—There is no economy in bad corks. If they are not sufficiently sound, and allow the air to escape, the liquor becomes flat, and consequently sour, and the bottles might nearly as well be left open. The corks should be soaked in the liquor before being put into the bottles, and if the bottles be then laid on their sides, the corks will swell so as to be perfectly tight. It need hardly be added that great care should be taken that the bottles have been thoroughly washed and are perfectly clean.

BRANDY.—To 40 gals. of pure or neutral spirits, add 1 lb. crude tartar, dissolved in 1 gal. hot water; acetic ether, $\frac{1}{4}$ pint; bruised raisins, 6 lbs.; tinct. kino, 2 ounces; sugar, 3 lbs.; color with sugar coloring. Stand 14 days, and draw off.

BRANDY, BRITISH.—1. Clean spirit, 100 gals.; nitric ether, 2 lbs.; cassia buds (ground), $\frac{1}{2}$ lb.; bitter almond meal, $\frac{1}{2}$ lb.; orris root (sliced), 6 ounces; powdered cloves, 1 ounce; capsicum, 1 oz.; good vinegar, 2 gals.; brandy coloring, 1 quart. Mix well in an empty cognac cask, and let them macerate for a fortnight, occasionally stirring. The proportion of the ingredients may be varied by the skillful brewer, as much depends on their respective strengths.

2. Clean spirit, 100 gals.; strong vinegar, 3 gals.; bitter almonds (ground), $\frac{1}{4}$ lb.; cassia buds (ground), $\frac{1}{2}$ lb.; orris root (ground), 7 ounces; Guinea pepper (ground), 6 oz.; powdered cloves, 1 ounce; tincture of catechu, 4 pints; nitric ether, 2 pints; brandy coloring, 1 quart. Put them on the lees into a fresh emptied cognac cask, and macerate as before. Instead of tincture of catechu you may use half a pound of the powder mixed with hot water to a paste.

3. Good plain malt spirit (17 up), 100 gals.; finely powdered catechu, 12 ounces; tincture of

vanilla, 2 ounces; burnt sugar coloring, 1 quart or more. Mix well.

BRANDY, BLACKBERRY.—Essence of blackberry, 1 lb.; blackberry juice, 1 gal.; syrup of gum arabic, 1 gal.; pure spirits, 4 barrels.

BRANDY, CHERRY.—1. To every 10 gals. of brandy made by the receipt for French brandy, add 3 quarts of wild black cherries, stones and all bruised; crushed sugar, 2 lbs.; let it stand for one week, then draw or rack it off as it is wanted for use.

2. Good whisky, 10 gals.; wild black berries, 5 quarts well bruised with stones broken; common almonds, shelled, 1 lb.; white sugar, cinnamon, cloves, and nutmeg, well bruised, of each $\frac{1}{2}$ oz. Mix, and let them stand 12 days, and draw off. This, with the addition of 2 gals. brandy, makes most superior cherry brandy.

BRANDY, COGNAC.—To every 10 gals. of pure spirits add 2 quarts New England rum, or 1 quart Jamaica rum, and from 30 to 40 drops of oil cognac cut in half a pint of alcohol, and color with burnt sugar to suit.

BRANDY, To Decolorize.—When stained by the cask, a nail, or dropping a bit therein, when boring for a faucet, or any other cause, add about one quart of new milk to ten gallons; let it settle or filter.

BRANDY, FRENCH.—Pure spirits, 1 gal.; best French brandy, or any kind you wish to imitate, 1 quart; loaf sugar, 2 ounces; sweet spirits of nitre, $\frac{1}{2}$ ounce; a few drops of tinct. of catechu, or oak bark, to roughen the taste if desired, and color to suit.

BRANDY, PALE.—Is made the same as by the above receipt, using pale instead of the French, and using only 1 oz. tinct. of kino for every 5 gals.

BREWERIES.—The size of a brewery is stated in the number of quarters of malt that can be used in one brewing; thus, a brewery having a mash tun in which twenty combs of malt can be mashed at a brewing, would be a "ten quarter brewery", and so on, the rest of the plant being made in proportion.

Until steam came into general use as a motive power, all the labor was done by hand or horse power; sometimes a water wheel was used; but it is believed that on no occasion has wind power been applied. Of late years, steam has not only been used in breweries as a motive power, but also as a means of transmitting heat; so that the brewer having a boiler to supply steam to the engines, uses it also to supply steam for boiling both liquor and wort, either by forming the boiling coppers with an outer pan or jacket of iron, and passing steam through the space between that and the inner pan of the copper, or by passing the steam through coils of copper pipe fixed at the bottoms of vessels made of wood, iron, or copper, whichever of these be preferred.

In building a brewery every advantage should be taken of any favorable natural features of the locality, such as a hill side, where the building may be arranged so that the utensils can be placed in a position one above another in level, taking advantage of the natural slope to save labor, which might otherwise have to be expended in pumping the worts or beer about. A good supply of suitable water, or "liquor", as it is called in breweries, is also indispensable. That there is this should always be ascertained before either building a new brewery or extending an old one.

The mash tun should be made either of good yellow deals or of oak, and should have a false bottom, generally of iron, made of several plates, so as easily to be removed for cleansing the tun. These plates are very closely perforated with holes about one twelfth of an inch in diameter; sometimes, however, with slots that width, but about two inches to three inches long, cast in them. These slots and also the small holes are about three eighths of an inch on the bottom side of the plate, being made so much taper to prevent their blocking. The plates with slots are more expensive than the others, but some brewers prefer them. The mash tun should contain from eighteen to nineteen cubic feet for every quarter of malt. Formerly, when the crushed malt had been placed in the tun, the nearly boiling hot liquor was run in, and the whole was thoroughly mixed together by men with poles, each having several cross pieces, about the size of the staves of a ladder, in one end. This operation is termed mashing, and these oars are still used by some brewers, more especially where a "Steele's" or a similar machine is used.

A better and more certain method of mashing was required; for it was found that in some parts of the mash tun a sort of cake or dumpling would be formed, the outside of which, consisting of a pasty mass of flour, prevented the liquor reaching the inside, to extract the valuable ingredient of the malt. The machine which for many years has been fitted to mash tuns, to perform this operation, is made as follows: A circular crank, with radial teeth, is bolted to the sides of the mash tun; a vertical shaft is erected in bearings in the center of the tun. This shaft is either carried some few feet above the top of the tun, or else passes through a stuffing box in the bottom, and is worked by bevel wheels from a horizontal shaft. The vertical shaft supports loosely a bearing which carries one end of a second horizontal shaft, which is inside the tun, at about half its depth. The other end of this shaft has a pinion keyed upon it. This pinion gears with it, and is supported by the circular rack before mentioned. A revolving motion is given to this horizontal shaft by bevel wheels from the vertical one, and upon it is hung a sort of rake, which, as the shaft revolves, thoroughly mixes up the mash. Sometimes there are two, and even three of these rake shafts. It will be obvious that, as these shafts revolve, the pinion gearing into the fixed rack causes the whole to revolve somewhat slowly round the tun.

In large breweries, where there are sometimes a dozen or more mash tuns, rather than have a large engine, it is better to have a small one to pump all the liquor, and another to grind the malt; and these may be kept at work all day, preparing for the morrow. Indeed, a vast amount of money in first cost, and in labor afterwards, may be saved by properly planning and arranging everything beforehand.

BREWING.—The process of brewing has been fully described in many excellent treatises, from which the intelligent reader can obtain all the knowledge he requires; but we think it will be of service to furnish a condensed view, of what is essential to brewing successfully, on the scale suitable for a single household, and carefully avoiding all such details as are not absolutely requisite.

The Boiler.—The material of which this is

made requires attention. An iron boiler will be found suitable, but it is much less desirable than one of copper. A copper boiler, although at first more expensive, is to be preferred, as it can be kept cleaner, is more readily heated, will last for a greater length of time, and as old metal will be worth about half its original cost. A boiler which can contain about forty-five gallons, will be found most convenient for domestic use. It is large enough to produce half a hoghead of strong ale, and the same quantity of table beer, which for many families will be found a sufficient quantity. A pipe of about an inch and three quarters in diameter should project from the bottom of the boiler, and beyond the brickwork with which it is built up, and this pipe ought to be situated so as completely to drain off all the liquor from the boiler; but this it cannot do unless the internal orifice of the pipe be on a level with the lowest part of the boiler. Into this pipe a tap is to be fixed without any bend or curve in it, so as the more readily to allow the hops to pass through. During the process of brewing a piece of canvas may be rolled round the end of the tap so as to hang down into the sieve through which the contents of the boiler are to be strained.

The Mash-Tub.—A sherry-cask, with one fourth of its length cut off, will make an excellent and cheap mash-tub, capable of containing about eighty gallons. At the distance of about a couple of inches from the bottom of the mash-tub, a wooden hoop must be fixed to support a false bottom of wood, perforated with numerous small holes, close to each other. Both the false bottom, and the hoop on which it rests, must be movable, and the latter must be attached to the sides of the tub with small nails. The mash-tub must be furnished with a straight tap, on a level with the bottom of the vessel, for the purpose of drawing off the worts. The mash-tub must be placed on the stand or gawntree, at a height sufficient to allow the underback to be placed with facility below the tap in the mash-tub.

The Oar.—This is a mashing-stick, consisting of an ash pole about two yards in length, having at its extremity a frame about twelve inches long, and narrower at the lower than at the upper end. Across this frame there are several spars, by which it is rendered a convenient implement for thoroughly mixing the malt, and bringing it all in contact with the water. The person whose business it is to use the mashing-stick, and to stir the worts in the boiler, must be enabled to stand sufficiently high to perform the operation efficiently, and for this purpose he ought to be furnished with a set of steps of a suitable height.

Gauge Sticks are of importance to enable the brewer accurately to ascertain the quantity of worts in the boiler; to measure the number of gallons of water in the mash-tub, or the quantity of liquor in the fermenting tuns or other vessels. These useful implements may be easily made by putting into the different vessels they are intended for, a certain number of gallons of water, and marking the stick at the various points at which the water rises when any specified number of gallons are successively introduced.

The Underback and Coolers.—The mash-tub may be made by using the fourth part of the sherry cask already spoken of. It will suit well as an underback, and along with three or four large tubs to serve as coolers, will be sufficient

for the brewing of half a hogshead of ale, and the same quantity of table beer.

Fermenting Tuns, etc.—For half a hogshead of ale, and the same quantity of table beer, two fermenting tuns will be necessary, each containing forty-two gallons. Besides these, a wooden vessel, or "piggin," holding about a gallon, and having a long upright handle, will be necessary for the purpose of lifting the worts from the underback into the coolers, and a couple of pails will be requisite, each of them being marked so as to indicate two gallons and a half.

The Thermometer and Saccharometer.—The art of brewing requires that the degree of heat, and the quantity of saccharine or sweet matter in the liquid be correctly ascertained. For these purposes the instruments are requisite. Their mode of action will be explained to those who purchase them by the manufacturer, and their uses will be illustrated in the instructions we are about to give.

The Brewhouse and Vessels.—In making the comparatively small quantity of liquor required in a single household, it is not only difficult, but often quite impossible, to have an outhouse set apart for brewing, and for no other purpose. Yet it is a very desirable thing if this can be done. Washing, for example, ought never to be carried on in a brewhouse; as nothing is more injurious than to leave the remnant of dirty soapsuds in the tubs used in brewing. In fact, the greatest cleanliness is indispensable. All the vessels should be perfectly sweet, and free from mustiness or any other smell; they ought to be strictly examined the day before the brewing commences, and should never be used for any other purpose; and they ought to be carefully cleansed and kept quite free from dirt.

To Clean Casks.—These should be well cleansed with boiling water, and if the bung-hole be large enough, they should be scrubbed inside with a handbrush, sand, and fuller's earth, and afterwards scalded. As to the coolers, and indeed all the vessels, care should be taken not to let the water stand in them any length of time, as in all water left stagnant a prodigious multitude of animalcules are generated, which, although too minute to be visible to the naked eye, are easily discerned by the microscope. Water in which these creatures are generated emits an intolerable stench; and if the vessels containing them are of wood, they retain the smell, and hardly any amount of scrubbing will eradicate it.

Zinc-Lined Coolers.—So important is it that the coolers should be free from any bad odor, that we recommend that the interior of the vessels be lined with zinc; this secures greater purity, and expedites the cooling of the worts. The mash-tub should be kept scrupulously clean, no grains being allowed to remain in it longer than the day after the brewing. We shall now make a few remarks on the ingredients used in brewing, and then give a description of the process.

Water.—Different opinions are entertained as to the relative merits of the water for brewing; but we may with confidence state that rain water is certainly superior to any other for the purpose. It is, however, difficult to obtain this in a condition of sufficient purity, as the rain water collected from the roofs of houses carries particles of vegetable substances, imparting to the water a nauseous flavor. The purest water is that

produced from melted snow, collected in the open fields after a heavy fall. This water possesses the highest degree of purity, and is all but identical with distilled water; it being, in fact, the result of distillation. If it is desirable that rain water should be used, let it be obtained in as pure a condition, and as free from any peculiar taste and odor as possible. River water is well suited to the purpose so far as its softness is concerned, but it contains, especially in the warmer and autumnal months, a large quantity of both animal and vegetable substances. Hard water, in consequence of its chemical constitution, has less power than the two other kinds to extract the virtues of the malt and the hops; but this inconvenience may be obviated by raising the heat of the water. Skillful brewing, no doubt, can do much towards rendering the liquor made from hard water as good as any other; but undoubtedly pure rain water is the best.

Malt.—The best malt has a sweet smell, a mellow taste, a round body, and a thin skin; pale malt is adapted for domestic brewing, and brown malt for public breweries.

Hops.—The best hops are of a bright green color, sweet smell, and a feeling of clamminess when rubbed between the hands.

Brewing.—We shall now describe the process of brewing, for, say, half a hogshead of strong ale, the same quantity of middle ale, and a quarter hogshead of table beer. This will require six bushels of malt, and care must be taken that it has not been dried at too high a temperature, nor ground more than three days, and that it is pale malt, and of the best quality.

Heat Required.—It is of the utmost consequence to obtain such a degree of heat as shall be best adapted to extract the essential properties of the malt. Put forty-four gallons of boiling water, heated to 212 degrees of the thermometer, into the mash-tub, and add five or six gallons of cold water, so as to reduce the heat from the boiling point to 182 degrees. Put the malt into the mash-tub, and with the oar or mashing-stick stir it so completely that the water shall have access to every part. When this is done, let about a half-peck of the malt be strewed on the top of the mash in the mash-tub; this will serve as a non-conductor, and tend to keep in the heat. The cover is now to be put on the mash-tub, a blanket placed on the cover, and sacks on the blanket. Every means must be employed to keep in the heat, to prevent the steam from escaping. Let it be observed that there are now fifty gallons of water in the mash-tub, and six bushels of malt, or about eight and a quarter gallons of water to each bushel of malt. The mash must be left covered from two to three hours, after which some of the worts is to be run off into a pail and returned again, till at last the liquor running from the tap appears perfectly clear, and then let it run into the underback. When the worts have run off for some time, and the bed of the mash begins to appear, water at 190 degrees of heat must be added. This must be done in such a manner that the water shall fall in a shower all over the surface of the mash at the same moment, so as to carry with it the virtues of the malt left behind by the liquor already run off. While this new supply of water is being showered on the surface of the mash, the tap is still running, and the first forty-four gallons must be set aside for the half-hogshead of strong ale;

the next 40 gals. for the half-hogshead of the ale of middle strength, when the tap should be shut, and the worts intended for the table beer allowed to remain in the mashing, but 24 gals. of water at 195 degrees of temperature must be added to the mash for the table beer, in the manner already described.

Boiling the Worts.—In boiling the worts for the strong ale, the 44 gals. already set aside for the purpose are now to be put into the boiler, and raised to the temperature of 200 degrees. Put 2 lbs. of the best hops, well rubbed and separated by the hand, into the liquor, and boil briskly for three-quarters of an hour; stir well during the boiling. Add 2 pounds more of the hops, rubbed and separated as before, and let the boiling be continued for 25 or 30 minutes longer. The quantity of 44 gals., thus boiled, will be reduced by evaporation, and by the liquor absorbed by the hops, to about 30 gals.; and before drawing it off its specific gravity should be tested by the saccharometer. This ought to be from 102 to 108, but if greater strength be required, a quarter of a pound of raw sugar for each gallon should be added, which ought to produce a specific gravity of from 112 to 118, equal to the best ale. The liquor is now to be run off into the tubs, the piece of canvas already spoken of being fixed on the tap so as to direct the liquor through the hair sieve into the vessel to contain it. It is then put into the coolers to the depth in summer of not more than two, and in winter about three or four inches.

The Second Worts.—When the liquor for the strong ale is out of the copper, the second worts must be put into it along with two pounds of fresh hops, and boiled briskly for an hour and a half. If, when tested by the saccharometer, the specific gravity is only 51, and if the quantity of thirty gals. be in the boiler, 20 pounds of sugar must be added, which will increase it to 73 or 74. After boiling a few minutes, draw off the liquor and place it in the coolers. The worts for the table beer must now be put into the boiler, with the four pounds of hops boiled in the processes before referred to. It must be boiled for two hours, and when the boiling is nearly completed, half a pound of sugar per gallon will give the beer a suitable degree of specific gravity.

Fermentation.—Here it must be stated, that for each kind of ale or beer it is requisite that there should be a surplus quantity of a couple of gallons to supply the loss occasioned by the fermentation. It is desirable to have three fermenting tuns. When the liquor for the strong ale has cooled down to 85 degrees, take out about 1 gal. of it, and pour into it three English pints of brewer's strong ale yeast of the best quality. Pour this mixture into the tun, into which put the worts, and let it then be well incorporated with the yeast, and cover up the tun for the fermentation. The same process is to be carried out with the ale of the second strength, but the table beer is to be fermented at 80 degrees, and one English pint of yeast will be sufficient.

The morning after the liquor has been put into the tuns with the yeast, the surface of the worts ought to be covered with a white cream; this is to be stirred up with the contents of the tun, and some of the liquor subjected to examination. Some decrease of specific gravity, and a slight addition to the heat of the liquor ought to be

detected. The state of the liquor must again be examined into in the evening, and if the fermentation be weak some yeast must be added, and mixed up with the mass of the liquor. If by the second morning the work is going on well, the surface of the liquor will be covered with thick froth; but on testing the condition of the liquor, if there appears no indication of an increase of heat, and no apparent diminution of specific gravity in it, let the head of froth be broken up, and the whole be well stirred. The head of froth which afterwards appears, of a dark brown color, on its surface, must be carefully removed, as it will fall to the bottom and spoil the flavor of the ale. The same remark may be made as to the yeast which appears at the bung-hole during the fermentation, which continues for some time after the ale is put into the casks.

After the ale and beer are made, the next process we come to is that of

Fining.—There are several methods of doing this. Perhaps as good a way as any is to dissolve an ounce of isinglass in a quart of stale beer, allowing it to remain for several days; add another quart of the stale beer, strain through a sieve, and put an English pint to each half-hogshead.

CARBONATED DRINK.—Two quarts of ice water, fourteen tablespoonfuls of vinegar, two teaspoonfuls of ground ginger; sweeten to taste, and add one teaspoonful of soda and one of cream tartar.

CHAMPAGNE, AMERICAN.—Good cider (crab-apple cider is the best), 7 gals.; best fourth-proof brandy, 1 quart; genuine champagne wine, 5 quarts; milk, 1 gal.; bitartrate of potassa, 2 ounces. Mix, and let stand a short time; bottle while fermenting. An excellent imitation.

CHAMPAGNE, BRITISH.—To every five pounds of rhubarb, when sliced and bruised, put 1 gal. of cold spring water; let it stand three days, stirring two or three times every day; then press and strain it through a sieve, and to every gallon of liquor, put three pounds and a half of loaf sugar; stir it well, and when melted barrel it. When it has done working bung it up close, first suspending a muslin bag with isinglass from the bung into the barrel. To 15 gals. of liquor put 2 oz. of isinglass. In six months bottle it and wire the bottles; let them stand up for the first month, then lay 4 or 5 down lengthways for a week, and if none burst, all may be laid down. Should a large quantity be made, it must remain longer in cask. It may be colored pink by putting in a quart of raspberry juice. It will keep for many years.

CHAMPAGNE, BURGUNDY.—Loaf sugar, 56 lbs.; brown sugar (pale), 48 lbs.; water (warm), 45 gals.; white tartar, 4 ounces. Mix, and at a proper temperature add yeast, 1 quart; afterwards add sweet cider, 5 gals.; bitter almonds (bruised), 6 or 7 in number; pale spirit, 1 gal.; orris powder, $\frac{1}{2}$ ounce.

CHAMPAGNE, CIDER.—Good cider, 20 gals.; spirit, 1 gal.; honey or sugar, 6 lbs. Mix, and let them rest for a fortnight; then fine with skimmed milk, 1 quart. This, put up in champagne bottles, silvered, and labeled, has often been sold for champagne. It opens very sparkling.

CHAMPAGNE CUP.—To two ounces of powdered loaf sugar put the juice and rind of one

lemon pared thin; pour over these a large glass of dry sherry, and let it stand for an hour, then add one bottle of sparkling champagne and one of soda water, a thin slice of fresh cucumber with the rind on, a sprig of borage or balm, and ice with blocks of clear ice.

CHAMPAGNE, SHAM.—Take 1 lemon, sliced; 1 tablespoonful of tartaric acid; 1 ounce of race ginger; $1\frac{1}{2}$ pounds of sugar; $2\frac{1}{2}$ gallons of boiling water poured on the above. When blood warm, add 1 gill of distillery yeast, or 2 gills of home-brewed. Let it stand in the sun through the day. When cold, in the evening, bottle, cork, and wire it. In two days it is ready for use.

CHERRY BOUNCE.—Take 10 gallons of good whisky; 4 to 6 quarts of wild black cherries bruised so as to break the stones; common almonds, shelled, 1 lb.; white sugar, $1\frac{1}{2}$ lbs.; cinnamon, $\frac{1}{2}$ oz.; cloves, $\frac{1}{2}$ oz.; nutmeg, $\frac{1}{2}$ oz.; all bruised. Let stand 12 to 13 days, and draw off. This, with the addition of 2 gallons of brandy, makes very nice Cherry Brandy.

CIDER, General Rules for Making.—Always choose perfectly ripe and sound fruit.

Pick the apples by hand. (An active boy with the bag slung over his shoulder, will soon clear a tree. Apples that have lain any time on the soil, contract an earthy taste, which will always be found in the cider.)

After sweating, and before being ground, wipe them dry, and if any are found bruised or rotten, put them in a heap by themselves, for an inferior cider to make vinegar.

Always use hair cloths, instead of straw, to place between the layers of pomace. The straw, when heated, gives a disagreeable taste to the cider.

As the cider runs from the press, let it pass through a hair sieve into a large open vessel, that will hold as much juice as can be expressed in one day. In a day, or sometimes less, the pomace will rise to the top, and in a short time grow very thick: when little white bubbles break through it, draw off the liquor by a spigot, placed about three inches from the bottom, so that the lees may be left quietly behind.

The cider must be drawn off into very clean, sweet casks, and closely watched. The moment the white bubbles before mentioned are perceived rising at the bung-hole, rack it again. When the fermentation is completely at an end, fill up the cask with cider, in all respects like that already contained in it, and bung it up tight; previous to which a tumbler of sweet oil may be poured into the bung-hole.

After being made and barreled it should be allowed to ferment until it acquires the desired flavor, for perfectly sweet cider is not desirable. In the meantime clean barrels for its reception should be prepared thus: Some clean strips of rag are dipped into melted sulphur, lighted and hung in the bung-hole and the bung laid loosely on the end of the rag. This is to allow the sulphur vapor to well fill the barrel. Tie up a half pint of mustard seed in a coarse muslin rag and put it into the barrel, then put your cider in. Now add the isinglass, which "fines" the cider but does not help to keep it sweet. This is the old fashioned way, and will keep cider in the same condition as it went into the barrel, if kept in a cool place, for a year. The sulphur vapor checks the fermentation, and the sulphur in the

mustard seed keeps it checked. We hear that professional cider dealers are now using the bisulphite of lime instead of the mustard seed and sulphur vapor. This bi-sulphite of lime is the same as the "preserving powder." It is only another form of using the sulphur, but is more convenient and perhaps more effectual. Another method is to add sugar, one and a half pounds sugar to a gallon of the cider, and let it ferment. This makes a fermented, clear good cider, but sweet. It lasts sweet about six months, if kept in a cool situation.

Preparatory to bottling cider it should be examined, to see whether it be clear and sparkling. If not it should be clarified in a similar way to beer, and left for a fortnight. The night before it is intended to put it into bottles, the bung should be taken out of the cask, and left so until the next day, when it may be bottled, but not corked down until the day after, as, if this be done at once, many of the bottles will burst by keeping. The best corks, and champagne-bottles should be used, and it is usual to wire and cover the corks with tinfoil, after the manner of champagne. A few bottles may be kept in a warm place to ripen, or a small piece of lump sugar may be put into each bottle before corking, if the cider be wanted for immediate use, or for consumption during the cooler portion of the year, but for warm weather and for long keeping this is inadmissible. The bottled stock should be stored in a cool cellar, when the quality will be greatly improved by age.

CIDER, To Clear.—To clear and improve cider generally take two quarts of ground horse-radish and one pound of thick gray filtering paper to the barrel, and either shake or stir until the paper has separated into small shreds, and let it stand for twenty-four hours, when the cider may be drawn off by means of a syphon or a stop cock. Instead of paper a preparation of wool may be taken, which is to be had in the market here, and which is preferable to paper, as it has simply to be washed with water when it may be used again.

CIDER, BOILING.—To prepare cider for boiling, the first process is to filter it immediately on coming from the press. This is easiest done by placing some sticks crosswise in the bottom of a barrel—a flour-barrel with a single head is the best—wherein an inch hole has been bored, and covering these sticks with say four inches of clean rye or wheat straw, and then filling the barrel to within a foot of the top with clean sand or coal-dust—sand is the best. Pour the cider as it comes from the press into the top of this barrel, drawing it off as soon as it comes out at the bottom into air-tight casks, and let it stand in the cellar until March. Then draw it out with as little exposure to the air as possible, put it into bottles that can be tightly and securely corked, and in two months it will be fit for use.

CIDER, Without Apples.—To each gallon of cold water, put 1 lb. common sugar, $\frac{1}{2}$ oz. tartaric acid, 1 tablespoonful of yeast, shake well, make in the evening, and it will be fit for use next day. Make in a keg a few gallons at a time, leaving a few quarts to make into next time; not using yeast again until the keg needs rinsing. If it gets a little sour make a little more into it, or put as much water with it as there is cider, and put it with the vinegar. If it is desired to bottle this cider by manufacturers of small

drinks, you will proceed as follows: Put in a barrel 5 gallons hot water, 30 lbs. brown sugar, $\frac{3}{4}$ lb. tartaric acid, 25 gallons cold water, 3 pints of hop or brewers' yeast worked into paste with $\frac{3}{4}$ lb. flour, and 1 pint water will be required in making this paste, put all together in a barrel, which it will fill, and let it work 24 hours—the yeast running out at a bung all the time, by putting in a little occasionally to keep it full. Then bottle, putting in 2 or 3 broken raisins to each bottle, and it will nearly equal champagne.

CIDER, CHAMPAGNE.—Good pale vinous cider, 1 hoghead; proof spirit (pale), 3 gallons; honey or sugar 14 lbs. Mix, and let them remain together in a temperate situation for one month; then add orange-flower water, 1 quart; and fine it down with skimmed milk, $\frac{1}{2}$ gallon. This will be very pale; and a similar article, when bottled in champagne bottles, silvered and labeled, has been often sold to the ignorant for champagne. It opens very brisk, if managed properly.

CIDER, CHAMPAGNE.—Champagne cider is made as follows:—To 100 gals. of good cider put 3 gals. of strained honey, or 24 lbs. of good white sugar. Stir well and set it aside for a week. Clarify the cider with half a gallon of skimmed milk, or $\frac{1}{4}$ lb. of dissolved isinglass, and add 4 gals. of pure spirits. After 2 or 3 days bottle the clear cider, and it will become sparkling.

In order to produce a slow fermentation, the casks containing the fermenting liquor must be bunged up tight. It is a great object to retain much of the carbonic gas in the cider, so as to develop itself after being bottled.

CIDER, CHERRY.—30 gals. of apple cider, 8 quarts of dried black cherries, 2 quarts of dried blueberries, 1 quart of elderberries, 75 lbs. of brown sugar. If you desire to make smaller quantities, proportion the quantities of the ingredients accordingly.

CIDER, To CAN.—Cider, if taken when first made, brought to boiling heat, and canned, precisely as fruit is canned, will keep from year to year without any change of taste. Canned up in this way in the fall, it may be kept a half dozen years or longer, as good as when first made. It is better that the cider be settled and poured off from the dregs, and when brought to boiling heat the scum that gathers on the surface taken off; but the only precaution necessary to preservation of the cider is the sealing of it up air tight when boiling hot. The juice of other fruit can, no doubt, be preserved in the same way. To all tastes not already corrupted by strong drink, these unfermented juices are very delicious. The juice of the grape is better than wine a century old, and more healthy. Churches believing in literal eating and drinking at the Lord's supper could in this way avoid the poisonous fermented spirits and drink the pure unfermented juice of the grape, as was doubtless done by the primitive Christians.

CIDER, DEVONSHIRE.—The apples, after being plucked, are left in heaps in the orchard for some time, to complete their ripening, and render them more saccharine. They are then crushed between grooved cylinders, surmounted by a hopper, or in a circular trough, by two vertical edge-wheels of wood moved by a horse; after passing through which, they are received into large tubs or cives, and are then

called pomace. They are afterwards laid on the vat in alternate layers of the pomace and clean straw, called reeds. They are then pressed, a little water being occasionally added. The juice passes through a hair sieve, or similar strainer, and is received in a large vessel, whence it is run into casks or open vats, where every thing held in mechanical suspension is deposited. The fermentation is often slow of being developed; though the juice be set in November or December, the working sometimes hardly commences till March. Till this time the cider is sweet; it now becomes pungent and vinous, and is ready to be racked for use. If the fermentation continue, it is usual to rack it again into a clean cask that has been well sulphured out, and to leave behind the head and sediment; or two or three cans of cider are put into a clean cask, and a match of brimstone burned in it; it is then agitated, by which the fermentation of that quantity is completely stopped. The cask is then nearly filled, the fermentation of the whole is checked, and the cider becomes fine. If, on the first operation, the fermentation is not checked, the process of racking is repeated until it becomes so, and is continued from time to time till the cider is in a quiet state and fit for drinking.

CIDER, FRENCH.—After the fruit is mashed in a mill, between iron cylinders, it is allowed to remain in a large tun or tub for 14 or 15 hours, before pressing. The juice is placed in casks, which are kept quite full, and so placed upon gawntrees, or stillions, that small tubs may be put under them, to receive the matter that works over. At the end of 3 or 4 days for sweet cider, and 9 or 10 days for strong cider, it is racked into sulphured casks, and then stored in a cool place.

CIDER, To Preserve and Keep Sweet.—1. To one barrel of cider put 1 lb. of mustard seed, 2 lb. of raisins, and $\frac{1}{4}$ lb. of the sticks (bark) of cinnamon.

2. When the cider in the barrel is in a lively fermentation, add as much white sugar as will be equal to a $\frac{1}{4}$ or $\frac{1}{2}$ of a pound to each gallon of cider (according as the apples are sweet or sour), let the fermentation proceed until the liquid has the taste to suit, then add $\frac{1}{4}$ of an ounce of sulphite (not sulphate) of lime to each gallon of cider, shake well, and let it stand three days, and bottle for use. The sulphite should first be dissolved in a quart or so of cider before introducing it into the barrel of cider.

3. When fermentation commences in one barrel, draw off the liquor into another one—straining through a flannel cloth. Put into the cider $\frac{3}{4}$ of an ounce of the oil of sassafras, and the same of the oil of wintergreen—well shaken up in a pint of alcohol. But one difficulty is said to pertain to this preparation of cider. It is so palatable that people won't keep it long.

4. Much of the excellence of cider depends upon the temperature at which the fermentation is conducted, and is a point greatly overlooked by the manufacturers of this liquor. As soon as pressed from the fruit, it should be strained into sulphured casks and placed in a cool situation where the temperature does not exceed 50° Fah.—if left in the heating sun much of the sugar is converted into vinegar by the absorption of atmospheric oxygen, and thus the liquor becomes acid and rough. On the contrary, if the ferment-

tation be conducted at a low temperature, nearly the whole of the sugar is converted into alcohol and remains in the liquor instead of undergoing the process of acetification.

The acetous fermentation of the conversion of alcohol into vinegar proceeds most rapidly at a temperature of ninety-five degrees Fahrenheit, and at a lower temperature the action becomes slower, until at 46° Fah. no such change takes place. Independently of differences in the quality of the fruit, this is the principal cause of the superiority of the cider made by one person over another, living in the same neighborhood. The one has a cooler cellar or barn than the other to store his cider in.

In practice it has been found that sour and rough apples produce the best cider. This arises because they contain less sugar and more malic acid, and the presence of the latter impedes the conversion of alcohol into vinegar, but cider made with such apples can never equal in quality that prepared at a low temperature from fruit abounding in sugar, which, if properly strained or racked at every indication of fermentation, will keep good twenty years.

CIDER, To Keep Sweet and Sweeten when Sour.—To keep cider perfect, take a keg and bore holes in the bottom of it; spread a piece of woolen cloth at the bottom; then fill with clean sand closely packed; draw your cider from a barrel just as fast as it will run through the sand; after this, put it in clean barrels which have had a piece of cotton or linen cloth 2 by 7 inches dipped in melted sulphur and burned inside of them, thereby absorbing the sulphur fumes (this process will also sweeten sour cider); then keep it in a cellar or room where there is no fire, and add $\frac{1}{2}$ lb. white mustard seed to each barrel. If cider is long made, or souring when you get it, about 1 qt. of hickory ashes (or a little more of other hard wood ashes) stirred into each barrel will sweeten and clarify it nearly equal to rectifying it as above; but if it is not rectified, it must be racked off to get clear of the pomace, as, with this in it, it will sour. Oil or whisky barrels are best to put cider in, or $\frac{1}{2}$ pint sweet oil to a barrel, or a gallon of whisky to a barrel, or both, may be added with decidedly good effects; isinglass, 4 oz. to each barrel, helps to clarify and settle cider that is not going to be rectified.

CIDER, WESTERN.—To one pound of sugar, add one half an ounce of tartaric acid, and two tablespoonfuls of good yeast. Dissolve the sugar in one quart of warm water; put all in a gallon jug; shake it well, fill the jug with pure cold water, let it stand uncorked twelve hours, and it is fit for use.

CLARET, BRITISH.—1. Cider (rough), 35 gallons; red Cape, 45 gallons; red tartar, dissolved, 1½ pound. Mix well and fine.

2. Spirit, 5 gallons; cider, 50 gallons; red Cape, 35 gallons; good Port, 15 gallons; red tartar, dissolved, 2 pounds. Mix well and fine.

3. Cider, 50 gallons; spirit, 7 gallons; red Cape, 42 gallons; good Port, 5 gallons; red tartar, 2 pounds. Mix well and fine.

4. Red Cape or Port, 50 gallons; cider, 50 gallons; spirit, 10 gallons; red tartar, 2 or 3 pounds. Mix well and fine.

5. Six gallons of water, two gallons of cider, and eight pounds of Malaga raisins, bruised; put them all together, and let them stand closely covered in a warm place for a fortnight, stirring

them well every second day; then strain out the liquor into a clean cask, and put to it a quart of barberries, a pint of the juice of raspberries, and a pint of the juice of black cherries. Work it up with a little mustard-seed, and cover the bung with a piece of dough; let it stand at the fireside for four days; then bung it up, and let it remain a week, and bottle it off. When it becomes fine and ripe, it will drink like claret.

6. Rough Port, 50 gallons; cider, 50 gallons; cream of tartar, 3 pounds; powdered catechu, $\frac{1}{2}$ pound; spirit, 4 gallons. Mix. Red Cape may be used for Port.

CLARET CUP.—A bottle of light claret, one of soda water, a wineglassful of powdered sugar, a large glass of sherry, or small one of curacao, the rind of a lemon cut very thin, a few slices of cucumber with the rind on, a sprig of borage or mint, mix all well together, and ice it by putting in six or eight lumps of clear ice the size of an egg.

COLORING for LIQUORS.—Take 2 pounds crushed or lump sugar, put it into a kettle that will hold 4 to 6 quarts, with $\frac{1}{2}$ tumbler of water. Boil it until it is black, then take it off and cool with water, stirring it as you put in the water.

COLORING for LIQUEURS.—Blue—Sulphate of indigo, nearly saturated with chalk.

Yellow—Infusion of safflowers in water.

Green—Equal parts of each of the above.

Red—Cochineal in small quantities.

Violet—Turnsole.

Fawn color—White sugar, and heat it until of a proper color.

Dark red or brandy color—Burnt sugar or brandy coloring.

COOLING DRINK for Hot Weather.—A delicious and slightly aperient effervescing citrate of magnesia may be made by thoroughly mixing 3 ounces of powdered loaf sugar with 2 ounces of powdered citric acid, then add $\frac{3}{4}$ ounce of calcined magnesia, $1\frac{1}{2}$ ounce of bicarbonate of soda, and $1\frac{1}{2}$ ounce of tartaric acid. Pass the whole thrice through a fine sieve, and then moisten it with very strong alcohol. Granulate it by passing it through a coarse sieve, and dry on a wooden tray at a temperature of 50° C. When dry add ten drops of essential oil of lemons, and then bottle at once in clean dry bottles.

CORDIAL, ANISETTE (40 Gals.)—Put in a barrel 13 gals. alcohol, 75 per cent. Dissolve 2¼ oz. essence of green anise-seed in 1 gal. 95 per cent. alcohol, and add $\frac{1}{2}$ gal. orange-flower water, 8 or ten drops infusion mace, and 5 drops essence of cinnamon. Then put in the barrel 26 gals. sugar syrup, 25 degrees Baumé; stir fifteen minutes, and let it rest four or five days; then filter. Add 2 or 3 sheets of filtering paper.

CORDIAL, BLACKBERRY.—To one gal. of blackberry juice add four pounds of white sugar; boil and skim off, then add one ounce of cloves, one ounce of cinnamon, ten grated nutmegs, and boil down till quite rich; then let it cool and settle, afterward drain off, and add one pint of good brandy or whisky.

CORDIAL, CARAWAY.—Take 8 gals. spirit, 50 per cent.; 1 oz. oil of caraway which you dissolve in spirit 95 per cent.; 8 lbs. sugar; 8 lbs. water. Dissolve your sugar in the water; mix, stir, and filter.

CORDIAL, CINNAMON.—This is seldom made with cinnamon, but with either the essential

oil, or bark of cassia. It is preferred colored, and therefore may be very well prepared by simple digestion. If the oil be used, 1 dr. will be found to be enough for 2 or 3 gallons of spirit. The addition of 2 or 3 drops each of essence of lemon and orange peel, with about a spoonful of essence of cardamoms to each gallon, will improve it. Some persons add to the above quantity 1 drachm of cardamom seeds and 1 oz. each of dried orange and lemon peel. 1 oz. of oil of cassia is considered to be equal to 8 lbs. of the buds, or bark. If wanted dark it may be colored with burnt sugar. The quantity of sugar is $1\frac{1}{2}$ lb. to the gallon.

CORDIAL, CITRON.—Yellow rind of citrons, 3 lbs.; orange peel, 1 lb.; nutmegs bruised, 2 oz.; proof spirit, 13 gallons; distill or macerate, add water sufficient, and 2 lbs. of fine lump sugar, for every gallon of the cordial.

CORDIAL, CLOVE.—Bruised cloves 1 oz., or essential oil 1 dr., to every 4 gallons of proof spirit. If distilled it should be drawn over with a pretty quick fire. It is preferred of a very deep color, and is therefore strongly colored with poppy-flowers or cochineal, or more commonly with brandy coloring, or red sanders wood. It should have 3 lbs. of sugar to the gallon, and this need not be very fine. The addition of 1 drachm of bruised pimento, or 5 drops of the oil for every ounce of cloves, improves this cordial.

CORDIAL, CORIANDER.—1 lb. of coriander seeds; 1 oz. of caraways, and the peel and juice of 1 orange to every 3 gallons of proof spirit.

CORDIAL, CURACOA.—Essence of bitter oranges, 2 oz.; ess. of neroli, 2 oz.; ess. of cinnamon, $\frac{1}{4}$ oz.; 3 drs. mace, infused in alcohol. Dissolve the above essences in 1 gal. alcohol, 95 per cent.; then put in a clean barrel 13 gals. alcohol, 85 per cent.; 26 gals. sugar syrup, 30 degrees Baumé; and add 1 gal. perfumed spirit as above. Color with saffron or turmeric.

CORDIAL, GINGER.—Pick one pound of large white currants from their stalks, lay them in a basin, and strew over them the rind of an orange and a lemon cut very thin, or half a teaspoonful of essence of lemon, and one ounce and a half of the best ground ginger and a quart of good whisky. Let all lie for twenty-four hours. If it tastes strong of the ginger, then strain it; if not, let it lie for twelve hours longer. To every quart of strained juice add one pound of loaf sugar pounded; when the sugar is quite dissolved and the liqueur appears clear, bottle it. This cordial is also extremely good made with raspberries instead of currants.

CORDIAL, NOYAU.—Blanch and pound very fine two pounds of the best bitter and half a pound of sweet almonds. Add the thinly pared rinds of two lemons, and three tablespoonfuls of boiled milk which has become cold, put all together into a jar, and add two quarts of old whisky, cork up the jar, and let it stand for six weeks, shaking the jar every day. At the end of that time strain the liquor, and to every quart add three pints of clarified syrup, and filter through blotting-paper. The almonds that are strained from the liquor make a nice flavoring for puddings, by putting them into a wide-mouthed bottle and pouring whisky over them.

CORDIAL, PEPPERMINT.—To make peppermint cordial take thirteen gallons of recti-

fied spirits, one in five under hydrometer proof, twelve pounds of loaf sugar, one pint of spirits of wine that will fire gunpowder, fifteen penny-weights of oil of peppermint, and as much water as will fill up the cask, which should be set on end; after the whole has been well mixed this will make twenty gallons.

CORDIAL, Strawberry or Raspberry.—Sugar down the berries overnight, using more sugar than you would for the table, about half as much again. In the morning lay them in a hair sieve over the basin; let them remain until evening, so as to thoroughly drain; then put the juice in a thick flannel bag; let it drain all night, being careful not to squeeze it, as that takes out the brightness and clearness. All this should be done in a cool cellar, or it will be apt to sour. Add brandy in proportion of one-third the quantity of juice, and as much more sugar as the taste demands. Bottle it tightly. It will keep six or eight years, and is better at last than at first.

CREAM NECTAR.—Tartaric acid, 1 ounce; cream of tartar, 1 ounce; white sugar, $1\frac{1}{4}$ pounds; water, 1 pint; the whites of two eggs, well beaten; one tablespoonful of wheat flour. Put all the above articles in a tin dish, and heat it—but not to the boiling point—and then add a drop of good oil of lemon, or any other flavor you choose, and then you have the syrup. *Directions for Using.*—Take a glass two-thirds full of water, add 3 tablespoonfuls of the syrup, and as much soda as you can place on a dime. This makes a cool and refreshing drink in hot weather.

CREAM SODA.—Loaf sugar ten lbs., water 3 gals.; warm gradually so as not to burn; good rich cream, 2 quarts; extract vanilla, $1\frac{1}{2}$ ounce; extract nutmeg, $\frac{1}{2}$ ounce; tartaric acid, 4 ounces. Just bring to a boiling heat; for, if you cook it any length of time, it will crystallize; use 4 or 5 spoonfuls of this syrup instead of three, as in other syrups; put $\frac{3}{4}$ teaspoonful of soda to a glass; if used without a fountain. For charged fountains no acid is used.

CURRENT ICE WATER.—Press the juice from ripe currants, strain it, and put a pound of sugar to each pint of juice. Put it into bottles, cork and seal it, and keep it in a cool, dry place. When wanted, mix it with ice water for a drink; or put water with it, make it very sweet, and freeze it. Freezing takes away much of the sweetness. The juices of other acid fruits may be used in the same way.

EFFERVESCING FRUIT DRINKS.—Very fine drinks are prepared by putting strawberries, raspberries, or blackberries, into good vinegar, and then drawing it off, and adding a new supply of fruit, till enough flavor is secured. Keep the vinegar bottled, and in hot weather use it thus: Dissolve $\frac{1}{2}$ a teaspoonful, or less, of saleratus, or soda, in a tumbler (very little water), till the lumps are all out. Then fill the tumbler two-thirds full of water, and add the fruit vinegar. If several persons are to drink, put the fruit vinegar into each tumbler, and dissolve the soda in a pitcher, and pour into the tumblers as each person is ready to drink; delay spoils it.

ETHER, BUTRIC.—This is much used to impart a pineapple flavor to rum. Dissolved in 8 or 10 parts of alcohol it forms the pineapple essence. From 20 to 25 drops of this essence, added to 1 lb. sugar containing a little citric acid, imparts to the mixture a strong taste of pineapple.

ETHER, AMYLO-ACETIC.—This is a preparation of fruit oil and other ingredients, and when diluted with alcohol, it is sold as essence of jargonelle pear, and is used for flavoring different liquors. Fifteen parts amylo-acetic ether, with half a part of acetic ether, dissolved in 100 parts of alcohol, form what may be called the bergamot pear essence, which, when employed to flavor sugar, acidulated with a little citric acid, imparts the odor of the bergamot pear, and a fruity, refreshing taste.

ETHER, PELARGONIC.—This has the agreeable odor of the quince, and when dissolved in alcohol in due proportion, forms the quince essence.

ETHER, AMLITIC.—(Same as amylo ether) mixed with butyric ether, forms in alcoholic solution the banana essence.

ETHER, AMYLIC.—An alcoholic solution of this ether in the proportion of 1 part to 6 or 8 of alcohol forms a flavoring liquid under the name of apple essence.

FINING POWDER.—Take eggs, any quantity; beat them to a froth, and expose them to a gentle heat or in the sun to dry, then powder. In some cases a little fine wheat flour is added, the paste made into balls, and dried in the sun, or a warm room, and then powdered. Used for all the purposes of fresh eggs by solution in cold water.

FREEZING PREPARATION.—Common sal-ammoniac, well pulverized, 1 part, saltpetre 2 parts; mix well together. Then take common soda, well pulverized. To use, take equal quantities of these preparations (which must be kept separate and well covered previous to using) and put them in the freezing pot; add of water a proper quantity, and put in the article to be frozen in a proper vessel; cover up, and your wants will soon be supplied. For freezing cream or wines this can't be beat.

GIN.—Take 100 gallons of clean, rectified spirits; add, after you have killed the oils well, 1½ oz. of the oil of English juniper, ½ ounce of angelica essence, ½ oz. of the oil bitter almonds, ½ oz. of the oil of coriander, and ½ oz. of the oil of caraway; put this into the rectified spirit and well rummage it up: this is what the rectifiers call strong gin.

To make this up, as it is called by the trade, add 45 lbs. of loaf-sugar, dissolved; then rummage the whole well up together with 4 oz. of roche alum. For finings, there may be added 2 oz. of salts of tartar.

GIN, CORDIAL.—Of the oil of bitter almonds, vitriol, turpentine, and juniper, ½ a drachm each, kill the oils in spirits of wine; 15 gallons of clean, rectified proof-spirits, to which add 1 drachm of coriander seeds, 1 drachm of pulverized orris root, ½ pint of elder-flower water, with 10 lbs. of sugar and 5 gals. of water or liquor.

GIN, ENGLISH.—Plain malt spirit, 100 gals.; spirits of turpentine, 1 pint; bay salt, 7 lbs. Mix and distill. The difference in the flavor of gin is produced by varying the proportion of turpentine, and by occasionally adding a small quantity of juniper berries.

GIN, HOLLAND.—To 40 gals. of neutral spirits, add 2 ounces spirits nitre; 4 lbs. of loaf sugar; 1 oz. oil juniper; ½ ounce oil caraway. The juniper and caraway to be first cut in a quart of alcohol; stand 24 hours.

GIN, HOLLAND (To Reduce).—To 25 gals. pure Holland gin, add 25 gallons pure French spirit; ½ gallon of white sugar syrup; mix thoroughly.

GINGER POP.—1. Crushed white sugar 28 lbs., water 30 gals., yeast 1 pint, powdered ginger (best) 1 lb., essence of lemon ½ oz., essence of cloves ¼ oz. To the ginger pour half a gallon of boiling water and let it stand 15 or 20 minutes. Dissolve the sugar in 2 gals. of warm water, pour both into a barrel half filled with cold water, then add the essence and the yeast; let it stand half an hour, then fill up with cold water. Let it ferment 6 to 12 hours, and bottle.

2. One and a half ounces of the best ground Jamaica ginger, 1 oz. of cream of tartar, 1 lb. of sugar, and 2 sliced lemons; to all of which add 4 quarts of boiling water, and ½ pint of yeast; let it ferment for 24 hours, strain and bottle it. In a week or two it will be ready for use.

3. Water 5½ gals.; ginger root, bruised, ¼ lb.; tartaric acid ½ oz.; white sugar 2½ lbs.; whites of 3 eggs, well beaten; lemon oil 1 teaspoon; yeast 1 gill. Boil the root for 30 minutes in 1 gal. of the water, strain off, and put the oil in while hot; mix. Make over night, and in the morning skim and bottle, keeping out sediments.

HOPS, To Choose.—Put them between the fingers or the palms of the hand, and if good, a rich glutinous substance will be felt, with a fragrant smell, and a fine yellow dust will appear. The best color is a fine olive green, but if too green, and the seeds are small and shriveled, they have been picked too soon and will be deficient in flavor. If of a dusty brown color, they were picked too late, and should not be chosen. When a year old, they are considered as losing one-fourth in strength.

LEMONADE.—White sugar 1 lb.; tartaric acid ¼ oz.; essence of lemon 30 drops; water 3 quarts. Mix.

LEMONADE, ITALIAN.—Pare and press 2 doz. lemons; pour the juice on the peels, and let it remain on them all night; in the morning add 2 lbs. of loaf sugar, a quart of good sherry, and 3 quarts of boiling water. Mix well, add a quart of boiling milk, and strain it through a jelly-bag till clear.

LEMONADE, MILK.—The juice of seven lemons, half a pint of sherry, ¾ of a pound of white sugar, and a quart of boiling water; mix, and when cold add a pint of boiling milk; let it stand for some hours, then strain clear through a jelly-bag, and ice. This is always better if made the day before it is required.

LEMONADE, PORTABLE.—1. Mix strained lemon juice with loaf sugar, in the proportion of 4 large lemons to a pound, or as much as it will hold in solution; grate the rind of the lemons into this, and preserve the mixture in a jar. If this is too sweet, add a little citric acid. Use a tablespoonful to a tumbler of water.

2. Tartaric acid, one-half ounce; loaf sugar, three ounces; essence of lemon, one-half drachm. Powder the acid and sugar; mix them and pour the essence of lemon upon them, a few drops at a time; when all is mixed, divide into twelve equal parts, and put them in white paper, like powders. When wanted, dissolve one in a tumbler of water, and lemonade will be the result.

LEMONADE, EFFERVESCING.—Take powdered white sugar, 1 pound; bicarbonate of soda, $\frac{1}{4}$ pound; essence of lemon, $1\frac{1}{2}$ drachms. Mix and divide it into six dozen papers.

Tartaric or citric acid, 5 ounces. Divided into the same number of papers.

The granulated effervescent powders found in the market are made in the following way:—A clean iron or copper pan is heated over a slow fire, and the mixture of finely pulverized sugar and citric acid put in and well stirred, until it commences to cake, without of course changing its color; the pan is then taken from the fire and the bicarbonate of soda stirred into the mixture, until it is uniformly distributed through the mass, when the whole is pressed through a coarse sieve, and the granules exposed to the air for a little while to harden. They are then ready for bottling. A tablespoonful of this put in a glass of water will dissolve almost instantaneously, producing a good lemonade.

MEAD.—The following is a good receipt for mead:—On twenty pounds of honey pour five gallons of boiling water; boil, and remove the scum as it rises; add one ounce of best hops, and boil for ten minutes; then put the liquor into a tub to cool; when all but cold add a little yeast spread upon a slice of toasted bread; let it stand in a warm room. When fermentation is finished, bung it down, leaving a peg-hole which can afterwards be closed, and in less than a year it will be fit to bottle.

MEAD, SARSAPARILLA.—1 pound of Spanish sarsaparilla; boil 5 hours, so as to strain off 2 gallons; add 16 pounds of sugar, and 10 oz. of tartaric acid. Half a wineglass of syrup to half pint tumbler of water, and one half teaspoonful of soda water, is a fair proportion for a drink.

METHEGLIN.—Mix one and a half barrels of water with as much honey as will cause an egg to rise a little above the water; then boil the mixture to one barrel, skimming off the surface. It will be a fine red or wine color, and clear; then remove from the fire, and when cold, put it into a barrel, leaving the bung-hole open for several days, until fermentation be over; then stop it close, and put into a cold cellar.

NECTAR, CREAM.—Part 1st; take one gallon water, 6 lbs. loaf sugar, 6 oz. tartaric acid, gum arabic 1 oz. Part 2d; 4 teaspoonfuls of flour, the whites of 4 eggs beat finely together; then add $\frac{1}{2}$ pint water; when the first part is blood warm put in the 2d, boil 3 minutes, and it is done. Directions: 3 tablespoonfuls of the syrup to a glass half or two-thirds full of water, add $\frac{1}{3}$ teaspoonful of carbonate of soda made fine; stir well and drink at your leisure.

ORANGEADE.—Squeeze the juice of seven good oranges, peel three of them, and pour boiling water over the peel, cover it close till cold, boil water and sugar together to a thin syrup, skim carefully; when all are cold, mix the juice, the infusion, and the syrup well together, with as much more water as will make a rich drink, strain through a jelly-bag, add a large glass of pale brandy, and ice it well with lumps of clear ice.

ORGEAT.—Boil two quarts of milk with a stick of cinnamon, and let it stand to be quite cold, taking out the cinnamon. Blanch four ounces of the best sweet almonds; pound them well (in a marble mortar) with a little rose water; mix them well with the milk; sweeten to your taste; let it

boil again for a few minutes; strain through a fine sieve till quite smooth and free from almonds. Serve either cold or warm, in handled glasses.

PORTER.—Pale malt, 8 quarters; amber malt, 6 quarters; brown malt, 2 quarters. Mash it twice, with 55 and 48 barrels of water, then boil with Kent hops, one cwt., and set with yeast, 10 gallons; salt, 7 pounds; flour, 2 pounds. Twenty barrels of good table beer may be had from the grains. If deficient in color, add burnt malt.

PORTER, For Bottling.—Pale malt, 5 quarters; amber malt, 3 quarters; brown malt, 2 quarters; burnt malt to color if required. Mash with twenty-four, fourteen and eleven barrels of water, then boil with Kent hops, one cwt., and set with yeast, 7 gallons; salt, 3 pounds. Mash the grains for table beer.

PORTER, To Bottle.—1. Choose clear weather, if possible.

2. Leave the bung out of the cask all night.

3. Fill your bottles, then throw sheets of paper over them to keep out the dust, and let them stand for twenty-four hours, then cork and wire.

4. Pack them away in a cool place.

If for exportation to a hot climate, the bung must be left out of the cask for twenty-four hours, and the bottles must not be corked for at least three days. If for immediate use, we may ripen it in two or three days, by adding a small piece of sugar to each bottle before corking.

PUNCH.—Water, 3 gals.; tartaric acid, 4 oz. or to taste; lump sugar, to sweeten; brandy, 3 pints; rum, 3 pints. The peels of three lemons grated, essence of lemon to flavor; rub the essence with a little lump sugar in a mortar, adding a little of the spirit.

PUNCH, MILK.—Yellow rinds of 2 dozen lemons; steep two days in two quarts of brandy; add spirits, 3 qts.; hot water, 2 qts.; lemon juice, 1 qt.; loaf sugar, 4 lbs.; boiling milk, 2 qts.; 2 nutmegs grated; mix, and in two hours strain through wool.

RATAFIA.—Ratafia may be made with the juice of any fruit. Take 3 gals. cherry juice, and 4 lbs. sugar, which you dissolve in the juice; steep in 2 $\frac{1}{2}$ gals. brandy ten days; 2 drs. cinnamon; 24 cloves; 16 oz. peach-leaves; 8 oz. bruised cherry kernels. Filter, mix both liquids, and filter again.

RUM, JAMAICA.—1. To 24 gallons New-England rum, add 5 gallons Jamaica rum; 2 oz. butyric ether; $\frac{1}{2}$ ounce oil of caraway, cut with alcohol, 95 per cent. Color with sugar coloring.

2. To 36 gallons pure spirits, add 1 gallon Jamaica rum; 3 ounces butyric ether; 3 ounces acetic ether; $\frac{1}{2}$ gallon sugar syrup. Mix the ethers and acid with the Jamaica rum, and stir it well in the spirit. Color with burnt sugar coloring.

RUM, PINE-APPLE.—To 50 gallons rum, made by the fruit method, add 25 pine-apples sliced, and 8 pounds white sugar. Let it stand two weeks before drawing off.

RUM, SANTA CRUZ.—To 50 gallons pure proof spirit, add 5 gallons Santa Cruz rum; 5 pounds refined sugar, in $\frac{1}{2}$ gallon water; 3 ounces butyric acid; 2 ounces acetic ether. Color if necessary.

RUM, ST. CROIX.—To 40 gallons p. or n. spirits, add 2 gallons St. Croix rum; 2 ounces acetic acid; $1\frac{1}{2}$ ounce butyric acid; 3 pounds loaf sugar.

RUM SHRUB.—Tartaric acid, 5 lbs.; pale sugar, 100 lbs.; oil lemon, 4 drs.; oil orange, 4 drs.; put them into a large cask (80 gals.) and add water, 10 gals. Rummage till the acid and sugar are dissolved, then add rum (proof), 20 gals.; water to make up 55 gals. in all; coloring 1 quart or more. Fine with 12 eggs. The addition of 12 sliced oranges will improve the flavor.

SALINE DRAUGHT.—Take 20 grains of carbonate of soda, and an equal quantity of white sugar, 25 grains of either lemon or tartaric acid; mix this in 2 glasses of water, as usual. If you substitute half a lemon for the acid, it will be a still more delicious draught and very refreshing in hot weather, or when feverish.

SCHIEDAM SCHNAPPS, To Imitate.—To 25 gals. good common gin, 5 over proof, add 15 pints strained honey; 2 gals. clear water; 5 pints white-sugar syrup; 5 pints spirit of nutmegs mixed with the nitric ether; 5 pints orange-flower water; 7 quarts pure water; 1 ounce acetic ether; 8 drops oil of wintergreen, dissolved with the acetic ether. Mix all the ingredients well; if necessary, fine with alum and salt of tartar.

SHERBET.—Boil in 3 pints of water 6 or 8 stalks of green rhubarb, and 4 oz. of raisins or figs; when the water has boiled about half an hour, strain it, and mix it with a teaspoonful of rose water, and orange or lemon syrup to the taste. Drink it cold.

SHERBET, LEMON.—Dissolve $1\frac{1}{2}$ lbs. of loaf sugar in 1 quart of water; add the juice of 10 lemons; press the lemons so as to extract both the juice and the oil of the rind, and let the peel remain a while in the water and sugar. Strain through a sieve, and freeze like ice cream.

SHERBET, ORANGE.—Take the juice of 1 dozen oranges, and pour 1 pint of boiling water on the peel, and let it stand, covered, half an hour. Boil 1 lb. of loaf sugar in 1 pint of water, skim, and then add the juice and the water from the peel to the sugar. Strain and cool, or freeze it. The juice of 2, and a little more sugar, improves it.

SHERBET, PERSIAN.—Pulverized sugar 1 lb.; super-carbonate of soda 4 ounces; tartaric acid 3 oz.; put all the articles into the stove oven when moderately warm, being separate, upon paper or plates; let them remain sufficiently long to dry out all dampness absorbed from the air, then rub about 40 drops of lemon oil, (or if preferred any other flavored oil,) thoroughly with the sugar in a mortar—wedge-wood is the best—then add the soda and acid, and continue the rubbing until all are thoroughly mixed.

SUMMER DRINKS.—The first, the best, because the safest for laborers, invalids, the sedentary, for all classes, at all times of the day and night, is half a glass at a time, repeated in 10 minutes if desired, of common cold water, at the temperature of the spring, or well, or reservoir, or cistern. Ice water is more palatable, but very often kills.

Any drink which contains alcohol, even cider, root beer, or domestic cordials—all are not only not harmless, but are positively injurious, because the atom of alcohol, by using the strength of the next minute for the present, leaves the system that next minute just that much weaker than it would have been had not that atom of

alcohol been taken; this is the case, because that atom of alcohol has not one particle of nutriment, hence cannot supply the system with one single atom of strength.

If anything is added to the summer drink, it should contain some nutriment, so as to strengthen the body, as well as to dilute the blood for purposes of a more easy flow through the system, as any one knows that the thinner the fluid is, the more easily does it flow. Some of the more nutritious and safe drinks are given below, especially for those who drink in the sun of summer, all to be taken at the natural temperature of the shadiest spot in the locality.

To any of them ice may be added, but it is a luxurious, not a beneficial ingredient, nor a safe one.

1. Buttermilk.
2. A pint of molasses to a gallon of water.
3. A lemon to a half a gallon of water, and a teacupful of molasses, or as much sugar.
4. Vinegar, sugar and water are substitutes, but the vinegar is not a natural acid, contains free alcohol, hence is not as safe or healthful.
5. A thin gruel made of corn or oats, is strengthening.
6. A pint of grapes, currants, or garden berries to a half gallon of water is agreeable.

Cold water applied to the head is very refreshing to harvesters. Wading in water abates thirst. Persons cast away at sea will suffer less from thirst, if the clothing is kept wringing wet with salt water. A piece of silk fitted in the hat is a great protection to the head against sun heat; it is an absolute protection if one side is well covered with gold leaf. As there is always a space between the top of the head and crown of the hat, hatters should practice this idea.

SYRUP, BLACKBERRY.—Blackberry juice, 1 pint; clarified sugar, $2\frac{1}{2}$ lbs.; brandy or whisky, $\frac{1}{2}$ glass. Dissolve the sugar by the aid of heat in the juice, and when cold add the spirit.

SYRUP, Aromatic Blackberry.—The aromatic blackberry syrup is made by taking aromatic syrup instead of clarified sugar. The former is made in the following way: Refined sugar, 5 pounds; water, 2 pints; bruised ginger, 1 ounce; cloves, $\frac{1}{2}$ oz.; calamus root, $\frac{1}{2}$ oz.; nutmegs, 1 oz.; boil for 2 hours the ginger, cloves, calamus, and nutmegs in the water, strain, and dissolve the sugar, and when near cold add oil of bitter almonds, 4 drops; essence of cinnamon, 15 drops; essence of nutmegs, 1 tablespoonful; essence of lemon, 20 drops. Stir the whole well until the oils are perfectly dissolved.

SYRUPS, To Color.—Powder cochineal 1 oz.; soft water 1 pint; boil the cochineal in the water for a few minutes, using a copper kettle; while boiling, add 30 grains of powdered alum, and 1 dr. of cream of tartar; when the coloring matter is all out of the cochineal, remove it from the fire, and when a little cool, strain, bottle, and set aside for use.

SYRUP, LEMON.—Coffee sugar, 3 lbs.; water, $1\frac{1}{2}$ pints; dissolve by gentle heat, and add citric acid 3 oz., and flavor with oil or extract of lemon. Or take citric acid in powder $\frac{1}{4}$ oz.; oil of lemon 4 drops; simple syrup 1 quart. Rub the acid and oil in 3 or 4 spoons of the syrup, then add the mixture to the remainder, and dissolve with gentle heat.

SYRUP, Imitation Lemon.—Four ounces of tartaric acid, powdered; 2 drachms of oil of lem-

on. This can be kept in a vial for a month, and then must be renewed. A tablespoonful, put into water sweetened with white sugar, makes six glasses of lemonade.

SYRUP, RASPBERRY.—Take orris root, bruised, any quantity, say $\frac{1}{4}$ lb., and just handsomely cover it with dilute alcohol, (76 per cent. alcohol, and water, equal quantities,) so that it cannot be made any stronger of the root.

SYRUP, SARSAPARILLA.—To simple syrup add 10 drops oil of anise; 20 drops oil of wintergreen; 20 drops oil of sassafras, and 6 oz. of caramel or coloring to the gallon. Before the oils are added to the syrup, they should be cut by grinding them in a mortar with as much sugar as they will moisten, or mix with a small quantity of alcohol.

SYRUP, SODA.—The common or more watery syrups are made by using loaf or crushed sugar, 8 pounds; pure water, 1 gallon; gum arabic, 2 ounces; mix in a brass or copper kettle; boil until the gum is dissolved, then skim and strain through white flannel, after which add tartaric acid, $5\frac{1}{2}$ ounces, dissolved in hot water; to flavor, use extract of lemon, orange, rose, pineapple, peach, sarsaparilla, strawberry, etc., $\frac{1}{2}$ ounce to each bottle, or to your taste.

SYRUP, VANILLA.—To simple syrup add $\frac{1}{2}$ oz. of extract of vanilla to the gallon.

TEARS of the Widow of Malabar.—Plain spirit at 18° B. 5 quarts; bruised cloves $\frac{1}{2}$ oz.; bruised mace 48 grs.; digest in a corked carboy for a week, add burnt sugar to impart a slight color, filter, and add white sugar $4\frac{1}{2}$ lbs.; dissolved in distilled or filtered rain water $\frac{1}{2}$ gallon; some add 2 or 3 oz. of orange-flower water. A pleasant liquor.

VINEGAR, To Make.—1. Make a box about three and a half by three feet, and seven feet long, with one side hung on hinges so that it can be opened and shut. Inside of this box, on cleats to hold them, fit shelves the size of the inside of the box; the shelves are to be about one and a half inches apart. On the upper side of these shelves gouge out channels with a one and a half inch chisel or gouge, a half or three-quarters of an inch deep, running from one end to the other (nearly), then turn and come back to (nearly) the other end, about six inches from the last channel made, and so continue until the upper side is covered with channels running from end to end. There should be cleats fastened to the under side of the shelf to prevent the shelf from warping; the cleats are put on with screws.

The channels must be made slightly slanting.

At the end of the last channel made bore a three-quarter inch hole. In this hole place a short wooden tube, so that when the cider arrives here it will fall through and into the commencement of the first channel in the next shelf below. All these shelves are made alike. The shelves must, of course, slant from side to side, and about two inches is the right slant; that is to say, one side of the shelf must be two inches lower than the other. One shelf must slant one way, and the one next below must slant the other way. Under the hole in the last channel of the bottom shelf, place a barrel or hogshead to catch the vinegar as it falls through the tube. Now bore a one inch hole in the bottom of the box, at one end, not into a channel, but so the vinegar cannot run out. Now in the other end of the first or lowest shelf, bore a one inch hole

near one corner, then in the next shelf above in the opposite end and corner, bore another like hole, and so continue until each shelf has such a hole bored through it, and of course you will want a hole in the top of the box. These holes are for a draft of air to circulate through the box, and as the air in the box is warmer than the air in the room there will of course be a draft of air through the box. The cider or other mixture heats itself in passing through.

To commence making vinegar, have your box or maker in some small room where you can have a fire and keep the temperature about 90° or 95° Fah. Have a barrel, or tub, or hogshead placed a little higher than the box and near the end where the first channel commences in the top shelf; in this tub or hogshead have a faucet so that you can regulate the amount of cider or mixture running. Your mixtures ought to be warmed to about 90 or 95 degrees. A few gallons or a half barrel of good strong vinegar should be run through first, so that the shelves will be well soured before letting other mixtures run through. It is a good idea to add one-third or one-fourth of good vinegar to any mixture of cider before allowing it to run through the maker. Then open the faucet so that a stream not larger than a straw shall fall into the commencement of the first channel in the top shelf, and when it falls through the last hole and into the barrel below the maker, you will find it is good, strong, and pure vinegar. This I believe to be the best and simplest way to make vinegar quickly yet discovered. The side hung on hinges should be kept closed while making and should shut tight. The outside box can be put together with nails, being careful to expose none to the action of the vinegar inside of the box. Do not use any nails or iron in putting in the shelves, etc., as if you do, you will have ink instead of vinegar. All fastenings must be made of wood pegs in place of nails, etc., etc. Of course, when once started, you will make vinegar night and day until through making.

If you do not intend to make any great amount of vinegar it would probably be best for you to make it with shavings, which you can get at the planing mills cheaply or for nothing. If not near a mill they can be made quickly by hand.

To make molasses vinegar, take any amount of water, and for every ten gallons used add one of molasses and a little yeast, and let it ferment. After done working let it run through the maker. If you want something very strong use two gallons, instead of one, for every ten gallons of water. Sorghum vinegar is made the same.

2. As my object is to give full practical directions to manufacture vinegar from cider and other alcoholic solutions, in the quickest possible time, I shall do so by using the fewest words I can, and give directions that all may understand. In the first place it is necessary that the cider should have passed through the first fermentation or got through working—the longer you let it stand after fermentation the better for the resulting vinegar—then get four hogsheads, remove three of the heads from two of the same, leave in the head that is the least likely to leak, then get four sticks, one and a half inches in diameter or thereabout, and one foot long; make a sort of table or frame-work just large enough to go inside the hogshead, and place it in the same; now lay across this frame-work sticks or boards, they need

not be tight together, but perhaps half an inch apart, so as to let the air go up through; now fill the hoghead with shavings from some hard wood (birch, or maple, or beech is best), then take one of the hogheads that has no head in and shave off one end so as to fit into the hoghead just filled, one or two inches; then place it on top of the other hoghead, the same standing on one end, and fill this one to within about eight inches of the top with shavings. The shavings are merely poured into the stands from baskets; they are not to be pressed or pounded down, as it is very important that they should lay in the stands loosely, so as to allow the air to circulate up through all parts of the stands; then get a wooden hoop, one that came off from one of the hogheads, and place it inside of the last hoghead filled, about eight inches from the top, and fasten it with wooden pegs; then get some good boards, matched are best, and cut out a head that will fit on the hoop just put in, and cork it tight with rags or cotton; then bore about fifty holes in the head not larger than a quarter of an inch. It is easiest to mark the head off in squares and bore the holes in the corner off each square all over the head, before the head is fastened in the hoghead; then cut off three or four boards to lay on top for a cover, then bore a hole about two inches from the bottom of the lower hoghead for a faucet to draw off the vinegar; then another three-quarter inch hole about one foot from the bottom, this to be left open for a vent hole, as it is highly important that there should be a current of air through the shavings, as this is what causes the acetification of the cider or other mixture poured through the shavings; also bore a three-quarter inch hole just below the perforated head; then fix the other two hogheads the same as the two just finished, and place all four in some room in some out-shed where you can have a fire if necessary, and you are ready to go making vinegar.

Now warm the room to about ninety by the thermometer, and keep it so for two or three hours; the cider or other mixture should stand in the vinegar room until it has acquired a temperature of about eighty or ninety degrees; then commence making vinegar by pouring into the stand marked No. 1, cider at the rate of one and a half to two gallons per hour and continue to do so until you have about ten gallons in the lower hoghead of No. 1 stand, then draw from No. 1 stand as much and as often as you put it in No. 1, and pour it into No. 2, and from No. 2 draw every hour pure made vinegar.

It will be remembered that the stands should stand quite level, so that the cider or mixture in spreading over the head bored full of holes will run through each and every hole, so that in dropping over the shavings it will be exposed to the air as much as possible. If on lifting the top, the air coming out smells strong of vinegar all is doing well (and the air should be a little warmer than the air in the vinegar room); if it is not so, then you must not pour the cider so often, and not quite so much at a time, and all will soon be right. It is not necessary that you should be particular to pour it through every hour, but in order to make the largest amount per day, you should pour it through as often as every hour, which is as often as it should be poured through. It would be advisable to have your cider or other mixture already worked be-

fore you commence making vinegar, as after you once get your stands in working order they keep improving, and will make better vinegar at the end of a week than when you first commenced with them; and after you once get them started you ought not to stop them until you get through making or have made enough to last six months. You can if you wish let the stands remain idle for a week at any time, but if idle longer, say a month or two, the shavings are very apt to get mouldy, then they must be exchanged for new ones. The shavings last from three to six months constant use, and may be known to be spoiled when the liquid coming from the stands is not clear, and the vinegar will not have the full strength. The shavings can be washed and used again, but it is about as well to get new ones. If you want to make a little cheaper vinegar, and yet one that you can warrant to keep pickles, you can take the cider and put three times as much water with it, and for every ten gallons of water add one gallon of cheap molasses or cheap whisky (which is best) and let it ferment; if molasses, then pour through the same as if it were cider; you will find you have a good strong vinegar, and not more than one in fifty can tell it from pure cider vinegar; if you want vinegar that is extra strong, then use two gallons of molasses in place of one as above, and you will find you have vinegar strong enough for table or any other use. After you get your stands making vinegar, it is a good plan to put with your cider or mixture about one gallon of vinegar to every eight or ten of mixture, as it acts as a kind of vinegar ferment, and the vinegar makes quicker and better; it is a good plan to stop the lower vent hole every night after you are done work for the day, and open it in the morning.

Commence work as early in the morning as you choose, and work as late at night as you wish. Some makers work all night, and the stands work as well or better than if idle nights. Should you not have or wish to purchase hogheads, and not be particular about making it very fast or in any great quantity, you can take common cider barrels and fix them the same as directed to fix the hogheads, but you must not pour more than three or four quarts through these small stands at once. Stands of this size can be put in some unoccupied room in the house or in the cellar; when you are making vinegar it is not expected you will pay your whole attention to it, but will attend to your other work, the same as usual, and pour through your vinegar every hour, or about as often as this; in this way the cost of making is little or nothing. Of course, the more stands you have the faster you can make. Should you have molasses sugar, or refuse molasses, mix about one gallon with ten of water, and ferment it, and pour it through the same as if it were pure cider. The same mixtures as used by the box-making arrangement can of course be used in making with the shavings. Rain or brook water is much better for making mixtures than well water, which is generally hard. It takes from two to five days for molasses and water or other mixtures to ferment, and may be known to be through fermenting when it remains quiet and the hissing noise ceases. If yeast is plenty and cheap, it is well to use two to four quarts to the barrel of mixture, and should be well stirred up. If the color is not dark enough, then take any quantity of cheap brown

sugar and put it in a kettle over a hot fire with about one half part water, and let it burn for about one hour; then put about one quart of water to every five pounds of sugar, and mix it well, and you have a good coloring and can color to suit your self. If there should be any trouble in the stands not working good, you can easily apply a remedy, but if you follow directions, everything will go on all right.

3. To eight gallons of clear rain water, add three quarts of molasses; turn the mixture into a clean tight cask, shake it well two or three times, and add three spoonfuls of good yeast or two yeast cakes. Place the cask in a warm place; and in ten or fifteen days add a sheet of common wrapping-paper, smeared with molasses, and torn into narrow strips, and you will have good vinegar. The paper is necessary to form the "mother," or life, of the liquor.

4. Acetic acid, 4 lbs.; molasses, 1 gallon; yeast, 1 quart; put them into a forty-gallon cask, and fill it up with rain water; stir it up, and let it stand one to three weeks, letting it have all the air possible, and you will have good vinegar. If wanted stronger, add more molasses. Should you at any time have weak vinegar on hand, put molasses into it to set it working. This will soon correct it.

5. Molasses 1 qt.; yeast 1 pt.; warm rain water 3 gals. Put all into a jug or keg, and tie a piece of gauze over the bung to keep out flies and let in air. In hot weather set it in the sun; in cold weather set it by the stove or the chimney corner, and in three weeks you will have good vinegar. When this is getting low, pour out some for use, and fill up the jug in the same proportion as at first, and you will never have trouble for want of good vinegar.

6. To 1 gallon of clear clover blossoms add 1 quart of molasses and a $\frac{1}{2}$ pound of sugar; pour over these one gallon of boiling water. When cold, add $\frac{1}{2}$ a pint of good yeast. If more water is needed, add as you please. It makes strong, pure vinegar.

7. Mix 5 qts. of warm rain water with 2 qts. of Orleans molasses, and 4 qts. of yeast. In a few weeks you will have the best vinegar you ever tasted.

8. One pint of strained honey and two gallons of soft water. Let it stand in a moderately-warm place. In three weeks it will be excellent vinegar.

VINEGAR, CAMP.—Take sliced garlic, 4 ounces; soy, 2 ounces; walnut catsup, 2 ounces; cayenne pepper, 1 ounce; black pepper, 1 ounce; chopped anchovies, 15; vinegar, 1 gallon; cochineal, 1 drachm. Infuse for one month, and strain.

VINEGAR, CIDER.—1. The most profitable return from such apples as are made into cider is the further transformation of the juice into vinegar. To do this, the barrels should be completely filled, so that all impurities that "working"—fermenting—throws off will be ejected through the bung-hole. This process should be completed before the barrel is put in the cellar, and when this is done, the purified juice should be drawn out of the original cask and put into others where there is a small amount of old vinegar, which will amazingly hasten the desired result. If no vinegar can be obtained to "start" the cider, it must remain in a dry cellar six months, and perhaps a year (the longer the better), before it will be fit for the table.

2. Save all your apple parings and slice in with them all waste apples and other fruits; keep them in a cool place till you get a pailful, then turn a large plate over them, on which a light weight should be placed, and pour on boiling water till it comes to the top. After they have stood two or three days pour off the liquid, which will be as good cider as much that is offered for sale; strain and pour it into a cask or some other convenient vessel, (anything that can be closely covered will do,) and drop in a piece of "mother," or vinegar plant, procured of some one that has good vinegar. If set in a warm place, the vinegar will be fit for use in three or four weeks, when it can be drawn off for use, and the cask filled with cider made from time to time by this process. The parings should be pressed compactly into a tub or pail, and only water enough poured over to come to their surface, otherwise the cider would be so weak as to require the addition of molasses. By having two casks, one to contain the vinegar already made and the other to fill into from time to time, one never need be without good vinegar. The rinsings of preserve kettles, sweetmeat jars, and from honey, also stale beer and old cider, should all be saved for the vinegar cask; only caution should be used that there be sufficient sweetness or body to whatever is poured in, or the vinegar may die from lack of strength.

3. A barrel or a cask of new sweet cider, buried so as to be well covered with fresh earth, will turn to sharp, clear, delicious vinegar in three or four weeks, as good as ever sought affinity with cabbage, pickles, or table sauce, and better than is possible to make by any other process.

VINEGAR, COLD WATER.—To six gallons of rain water, add one gallon of common molasses, and half a gallon of good hop yeast; set the cask in a warm place, and shake well once a week for a few weeks; and you will have excellent vinegar. A bit of gauze or very thin cloth should be tacked over the bung-hole, to keep out dust and insects till the vinegar is made; then put in the bung and keep it from the air or it will lose strength.

VINEGAR, COWSLIP.—To 4 gallons of water with the chill just taken off, add 6 pounds of brown sugar and $\frac{1}{2}$ a peck of cowslips, flowers and stalks together; put all into a cask with 3 tablespoonfuls of yeast; lay a piece of glass or slate over the bung-hole, and set it in a warm place till the vinegar grows sour, when the bung may be fastened down. This is a cheap and excellent vinegar, keeping pickles nice and crisp. If kept in a warm place the vinegar will be ready in six months. A quarter of an ounce of gelatine or isinglass will make it clear sooner.

VINEGAR, BLACK CURRANT.—To four pounds of fruit, very ripe, put three pints of vinegar; let it stand three days, stir occasionally, squeeze and strain the fruit. After boiling ten minutes, to every pint of juice add one pound of lump-sugar. Boil twenty minutes.

VINEGAR, HONEY.—Mix one pound of honey with a gallon of cider, and expose it to the sun, or keep it where it is warm, and in a few months it will be so strong that water will be necessary to dilute it.

VINEGAR, HORSE RADISH.—Pour a quart of best vinegar on three ounces of scraped horse-radish, an ounce of minced eschalot, and one drachm of cayenne; let it stand a week, and you

will have an excellent relish for cold beef, salad, etc., costing scarcely anything. Horseradish is in highest perfection about November.

VINEGAR, GOOSEBERRY.—Bruise the gooseberries, when ripe, and to every quart put 3 quarts of water; stir them well together, and let the whole stand for 24 hours, then strain it through a canvas bag. To every gallon of liquor add 1 lb. of brown sugar, and stir them well together before they are put into the cask. Proceed in all other respects as before. This vinegar possesses a pleasant taste and smell; but raspberry vinegar, which may be made on the same plan, is far superior in these respects. The raspberries are not required to be of the best sort, still they should be ripe and well-flavored.

VINEGAR, PERRY.—Put 30 or 40 lbs. of wild pears into a tub, pour water over them, and leave them 3 days to ferment. Repeat this every day for a month, at the end of which it will be good vinegar.

VINEGAR, DRY PORTABLE.—Wash well half a pound of white tartar with warm water, then dry it, and pulverize as fine as possible. Soak that powder with good sharp vinegar, and dry it before the fire or in the sun. Re-soak it as before with vinegar, and dry it as above, repeating this operation a dozen times. By these means you will have a very good and sharp powder, which turns water instantly into vinegar. It is very convenient to carry in the pocket, especially when traveling.

VINEGAR, PRIMROSE.—To 15 quarts of water put 6 lbs. of brown sugar; let it boil ten minutes, and take off the scum; pour on it half a peck of primroses; before it is quite cold, put in a little fresh yeast, and let it work in a warm place all night. Put it in a barrel in the kitchen, and when done working close the barrel, still keeping it in a warm place.

VINEGAR, RASPBERRY.—1. Take fresh raspberries picked from their stalks, 3 lbs.; best white wine vinegar, 2 pints. Steep the raspberries for a fortnight in a covered glass vessel in the vinegar, and then strain without pressing, adding afterwards 2 or 3 lbs. of loaf sugar, which is to be dissolved with a gentle heat in the water bath. By this method, which is unfortunately expensive, the beautiful aroma of the fruit is entirely preserved.

2. Boil down the juice of raspberries with an equal weight of sugar, and add to the mixture an equal quantity of the best white wine or French vinegar.

3. (Very fine.) Fill glass jars, or large wide-necked bottles, with very ripe but perfectly sound, freshly-gathered raspberries, freed from the stalks, and cover them with pale white wine vinegar; they may be left to infuse from a week to ten days without injury, or the vinegar may be poured from them in four or five. After it is drained off, turn the fruit into a hair sieve placed over a deep dish or bowl, as the juice will flow slowly from it for many hours; put fresh raspberries into the bottles, and pour the vinegar back upon them. Two or three days later change the fruit again, and when it has stood the same space of time drain the whole of the vinegar from it; pass it through a jelly-bag or a thick linen cloth, and boil it gently for 4 or 5 minutes with its weight of good sugar, roughly powdered, or a pound and a quarter to the exact pint, and be very careful to remove the scum entirely as it

rises. On the following day bottle the syrup, observing the directions we have given for the strawberry vinegar. When the fruit is scarce it may be changed twice only, and left a few days longer in the vinegar.

4. To each quart of raspberries, allow a pound of loaf sugar. Mash the raspberries and strew the sugar over them, having first crushed it with the rolling-pin. Let the raspberries and sugar stand till next day, keeping them well covered, then put them in a thin linen bag and squeeze out the juice with your hands. To every pint of juice allow a quart of the best vinegar. Bottle it, cork it tightly, and set it away for use. It will be ready in a few days.

5. Put a pound of very fine ripe raspberries in a bowl, bruise them well, and pour upon them a quart of the best white wine vinegar; next day strain the liquor on a pound of fresh ripe raspberries; bruise them also, and the following day do the same, but do not squeeze the fruit, or it will make it foment; only drain the liquor as dry as you can from it. The last time pass it through a canvas bag, previously wet with the vinegar, to prevent waste. Put the juice into a stone jar, with a pound of sugar to every pint of juice; the sugar must be broken into lumps; stir it, and when melted, put the jar into a pan of water; let it simmer, and skim it; when cold, bottle it; it will be fine, and thick, when cold, like strained honey, newly prepared.

VINEGAR, RHUBARB.—Excellent vinegar may be made from the rhubarb plant in the following manner: For 5 gals. take 12 ordinary sized stalks of rhubarb; pound or crush them with a piece of wood in the bottom of a strong tub; add 3 gals. of water; let this stand twenty-five hours, strain off the crushed rhubarb, and add 9 lbs. of sugar free from molasses, and a small teacupful of the best brewers' yeast; raise the temperature to 60° or 80°, and put into a twelve-gallon cask; place it in a position where the temperature will not fall below 60°. In a month strain off from the grounds, returning it to the cask again, and let it stand till it becomes vinegar.

VINEGAR, STRAWBERRY.—1. Take the stalks from the fruit, which should be a highly flavored sort, quite ripe, fresh from the beds, and gathered in dry weather; weigh and put it into large glass jars, or wide-necked bottles, and to each pound pour about a pint and a half of fine pale white wine vinegar, which will answer the purpose better than the entirely colorless kind, sold under the name of distilled vinegar, but which is the pyroligneous acid greatly diluted. Tie a thick paper over them, and let the strawberries remain from 3 to 4 days; then pour off the vinegar and empty them into a jelly-bag, or suspend them in a cloth that all the liquid may drop from them without pressure; take an equal weight of fresh fruit, pour the vinegar upon it, and 3 days afterwards repeat the same process, diminishing a little the proportion of strawberries, of which the flavor ought ultimately to overpower the vinegar. In three days drain off the liquid very closely, and after having strained it through a linen or a flannel bag, weigh it, and mix with it an equal quantity of highly refined sugar roughly powdered; when this is nearly dissolved, stir the syrup over a very clear fire until it has boiled 5 minutes, and skim it thoroughly; pour it into a delicately clean stone

pitcher, or into large China jugs, throw a folded cloth over and let it remain until the morrow; put it into pint or half pint bottles, and cork them lightly with new velvet corks, for if these be pressed in tightly at first, the bottles would be liable to burst; in four or five days they may be closely corked, and stored in a dry and cool place.

Damp destroys the color and injures the flavor of these fine fruit vinegars, of which a spoonful or two in a glass of water affords so agreeable a summer beverage, and one which, in many cases of illness, is so acceptable to invalids.

Where there is a garden the fruit may be thrown into the vinegar as it ripens, within an interval of forty-eight hours, instead of being all put to infuse at once, and it must then remain a proportionate time; one or two days in addition to that specified will make no difference to the preparation. The enameled stewpans are the best possible vessels to boil it in, but it may be simmered in a stone jar set into a pan of boiling water, when there is nothing more appropriate at hand; though the syrup does not usually keep so well when this last method is adopted.

2. Put 4 pounds of very ripe strawberries, nicely dressed, into 3 quarts of the best vinegar, and let them stand 3 or 4 days; then drain the vinegar through a jelly-bag, and pour it on the same quantity of fruit. Repeat the process in three days for a third time. Finally, to each pound of the liquor thus obtained, add 1 pound of fine sugar. Bottle, and let it stand covered, but not tightly corked, 1 week; then cork it tight, and set it in a cool, dry place, where it will not freeze.

VINEGAR, SUGAR.—Put nine pounds of brown sugar to every six gallons of water; boil it for a quarter of an hour, and then pour it in a tub in a luke-warm state; put to it a pint of new bran, let it work four or five days, stir it up three or four times a day, then turn it into a clean barrel, iron-hooped, and set full in the sun.

VINEGAR from SORGHUM.—For 40 gals. take 8 gallons of syrup; put this in first, then fill with rain water. If you can get filtered cistern water it will make the vinegar clearer. Add a teacupful of hop yeast, then set the barrel in a warm place with bung open.

VINEGAR, WHITE WINE.—Mash up 20 lbs. raisins, and add 10 gallons water; let it stand in a warm place for one month, and you will have pure white wine vinegar. The raisins may be used a second time the same way.

VINEGAR, To Increase the Sharpness and Strength of.—Boil two quarts of good vinegar till reduced to one; then put it in a vessel and set it in the sun for a week. Now mix the vinegar with six times its quantity of bad vinegar in a small cask: it will not only mend it, but make it strong and agreeable.

VINEGAR PLANT.—What is popularly known as the vinegar plant is only a form of the "mother of vinegar," which is, again, only a state of common mould. For the manner of obtaining it, we quote the following from the *Irish Farmers' Gazette*:—Leave a little vinegar in a small bottle to become stale (during hot, close weather is best), till a film appears on the surface. If a few fragments of coarse brown sugar be now added, it will somewhat aid its growth; but when the film has attained the thickness of parchment, it is ready for transfer to

syrup, where it soon becomes the housewife's normal vinegar plant. Procure a large jar or bottle, and to two quarts of boiling water add half a pound of treacle and half a pound of the commonest brown sugar; stir well together, and when cool transfer the film from the surface of the vinegar to the surface of the syrup; cover up to exclude air, and keep in a warm cupboard. This film will rapidly grow, and form a thick, slippery, gelatinous mass all over the surface of the syrup, and in course of six weeks or so the liquid will be changed to excellent vinegar. The vinegar plant can now be taken and divided into layers, or cut up into fragments, each piece of which if placed upon fresh syrup will rapidly grow and change the liquor into vinegar. The vinegar should be allowed to settle, and be strained before it is used.

WAX PUTTY, for Leaky Casks, Bungs, &c.—Spirits turpentine, 2 pounds; tallow, 4 pounds; yellow wax, 8 pounds; solid turpentine, 12 pounds. Melt the wax and solid turpentine together over a slow fire; then add the tallow. When melted, remove far from the fire; then stir in the spirits turpentine, and let it cool.

WHISKY, BOURBON.—To 100 gallons pure proof spirit, add 4 ounces pear oil; 2 oz. pelargonic ether; 13 drs. oil of wintergreen, dissolved in the ether; 1 gallon wine vinegar. Color with burnt sugar.

WHISKY, Irish or Scotch.—To 40 gallons proof spirits, add 60 drops of creosote, dissolved in 1 quart of alcohol; 2 ounces acetic acid; 1 pound loaf sugar. Stand 48 hours.

WHISKY, MONONGAHELA.—To 40 gallons proof spirits, add 2 ounces spirits of nitre; 4 pounds dried peaches; 4 pounds N. O. sugar; 1 quart rye (burnt and ground like coffee); $\frac{1}{4}$ pound allspice; $\frac{1}{2}$ pound cinnamon; $\frac{1}{2}$ pound cloves. Put in the ingredients, and after standing 5 days, draw it off, and strain the same, if necessary.

WHISKY, To Neutralize to make Various Liquors.—To 40 gallons of whisky, add $1\frac{1}{2}$ lbs. unslaked lime, $\frac{3}{4}$ lb. alum, and $\frac{1}{2}$ pint spirits of nitre. Stand 24 hours and draw it off.

WINE MAKING, Process of.—*The Must.*

—We suppose that the grapes are fully ripened and ready for use, although still on the vines. Select a clear day and gather the vintage as soon as the dew is off the grapes. Every bunch should be clipped from the vines with a pair of scissors, and carefully laid in a basket, or other vessel, to avoid bruising as much as possible. Gather none but the fully ripe grapes, and as many of them as can be pressed in a day to insure uniform quality, a very important consideration. Besides, the larger the quantity fermented at once, the better the wine will be. The grapes being brought to the wine house should now be carefully overlooked, and all the imperfect and decayed ones removed. The next consideration is whether the grapes shall be pressed with, or without their stems. Many recommend the latter, as there is an astringent property in the stems that gives a peculiar flavor to the wine; but no doubt the better way is to strip the berries from the stalks. This is sometimes done by hand picking, but a very simple instrument will greatly expedite the process. Take a box or trough, and lay within it, a few inches from the bottom and from the top, a lattice work of wooden slats (which had better

be joined without nails); upon this lay the bunches.

Lay a similar but smaller lattice, with a handle to work it, upon the mass, and by rubbing the grapes between the two, the berries will readily separate from the combs and fall through into the trough beneath. By the aid of an assistant, drawing the grapes as they fall, through an opening at the end of the trough, a great deal can be done in a short time. The next step is to mash the grapes. The oldest and best method is to stamp them with naked feet. In some wine countries the stampers wear sabots, or wooden shoes; sometimes wooden pounders or beetles are used, and sometimes the grapes are passed between rollers, grooved or fluted diagonally, so as not to break the grape stones. (There is a bitter principle in the stones or pips very much to be avoided.)

We now come to the pressing. The ordinary wine-press is a platform of solid wood, raised high enough from the ground to allow the must to run through a spout on one side into proper vessels. Two upright beams of heavy timber, and a cross beam at top, support a powerful screw that is worked by hand levers, like a windlass. The grapes are placed upon the platform and heavy timbers laid upon them: then above these other tiers of timbers are crossed, and upon all the great screw comes down, just as the President of the United States comes down upon the postmasters and collectors.

Besides the above there are smaller presses used, some of which are for sale at the agricultural warehouses. For small quantities of grapes a home-made press will answer. Take an ordinary barrel, bore holes in the bottom and lower half, with a half-inch auger, place a layer of clean straw on the bottom and against the sides, within which place the mashed grapes, and upon them a layer of straw and the barrel-head. Upon the whole place a short upright of stout timber. Stand this barrel in a tub, about a foot from the wall; nail a cleat to the wall, under which place the end of a lever that rests upon the upright; by hanging heavy weights upon the long end of the lever, you have a tolerably powerful wine-press.

A few hints about pressing. Some exquisite wines are made by piling a mass of trodden grapes in a great upright vessel, and using only the must that runs off without the aid of the screw. The rest of the must goes to press and produces an ordinary wine. When the wine press is used alone, three qualities can be produced: first, by reserving the must that flows from the gentlest pressure; secondly, by keeping apart the must of a severer pressure; and, thirdly, by extracting the last drop of juice with all the power of the screw, aided by a long rope attached to the lever, and worked by a windlass. We may also add, that a sort of bastard wine can be made, by adding water to the skins left after the third pressure, partially fermenting the mass, and subjecting it to a fourth pressure. The product, however, is not wine, but only a first cousin of wine, of poor quality, and known as piquette.

In this country these nice distinctions are not always observed. The entire product of a vineyard often goes to form one wine only, and in this view we shall continue; hinting, that as the select wines of the world bring enormous prices, and the common wines the opposite, that it is

worth the while of every American wine-maker to do his best, and follow the injunction of St. Paul: "Try all things."

Fermentation.—As soon as the must is pressed from the grapes, it is put in casks prepared for the purpose; these casks should be as large as possible, "for the larger the cask the better the wine." The casks should be three-quarters full only, and it is recommended by some, that a square hole, about six inches across, should be left at the top, covered by a coarse piece of canvas. The following extract from Mulder's "Chemistry of Wine," will explain this process clearly:

"Shortly after pressing, the liquid appears to be in motion, and little air bubbles rise to the surface; fermentation has begun; the juice, not quite clear at first, becomes more turbid, the motion of the liquor increases, and froth is formed on the surface; the gas bubbles become larger, the consistency of the liquor decreases, as do also its saccharine contents. In place of these, more and more alcohol is engendered, and the liquid, originally watery, and now enriched with alcohol to a greater or less degree, can no longer retain in a state of perfect solution various matters which it previously held in that condition. Fermentation reaches its highest point with greater or less rapidity, according to the temperature; in a moderate climate it generally occurs in from three to four days.

"When the fermentation is diminishing, and before it is completely finished, the whole mass of liquid is stirred up, in order to bring its elements into contact with each other afresh.

"After some days the whole mass reaches its highest point of effervescence, and at this it remains for three or four days; it then begins to diminish, and by forming a precipitate at the bottom, allows the wine to become gradually clearer.

"The wine is now racked off into another vessel, the sediment being left behind. Fermentation continues, but more quietly; and this is called after-fermentation. Sugar is being constantly converted into alcohol and carbonic acid, and a fresh precipitate is constantly forming, and depositing itself at the bottom.

"After the wine has undergone this after-fermentation for several months (and the fermentation generally increases again during the next spring; at the time, it is said, when the vines blossom, that is, when the warmth of the air excites fermentation again,) and has been drawn off from time to time in other vessels, in order to free it from the sediment which has been continually forming, it is transferred into casks in which it can be exported."

WINE, APPLE.—Take pure cider made from sound ripe apples as it runs from the press; put sixty pounds of common brown sugar into fifteen gallons of the cider, and let it dissolve; then put the mixture into a clean barrel, and fill the barrel up to within two gallons of being full, with clean cider; put the cask in a cool place, leaving the bung out for forty-eight hours; then put in the bung, with a small vent, until fermentation wholly ceases, and bung up tight; and in one year the wine will be fit for use. This wine requires no racking; the longer it stands upon the lees, the better.

WINE, APRICOT.—Wipe clean and cut twelve pounds of apricots; boil them in two gal-

lons of water till the water has imbibed the flavor of the fruit; then strain the liquor through a hair sieve, and to each quart of it put six ounces of loaf sugar; then boil it and add 6 lbs. sugar and one pound of sliced beetroot. When fermented, put into the cask a quart or more of brandy or flavorless whisky.

WINE, BLACKBERRY.—Gather the berries when perfectly ripe, and in such a manner as to avoid bruising. Empty them, as fast as gathered, into a tub until you have a quantity sufficient to fill, with juice, the cask in which you propose to make the wine.

Have the utensils, etc., required in the process, all ready before you pick—or at least before you mash your berries. Everything must be scrupulously clean. You want a keg, a beater of seasoned hard wood, a pail, a large bowl, tureen or other vessel into which to strain your juice, a good thick strainer—two or three folds of fine white flannel is the best material—a couple of yards of osnaburghs, a spare tub or a bucket or two, and a tub of soft spring water. Everything must be perfectly clean and free from dirt or odor of any kind.

Crush the berries thoroughly with the beater, and then after straining the liquor, which runs freely from the pulp through the folded flannel, empty it into the cask, measuring it as you put it in. When the juice has been all drained from the pulp, you proceed to press the pulp dry. If the quantity is large, this had best be done by a regular press, but if only a few gallons are wanted, the osnaburgh answers very well. Stretch out the osnaburgh, put a gallon or a gallon and a half of the pulp into the center, fold the cloth over it on each side, and let a strong hand at either end twist the cloth with all their strength; when the juice is well pressed out, remove and lay aside the cake of pomace, and put in more pulp. This process is apparently rough, but is both rapid and effectual. The juice so extracted is strained and measured into the cask as before mentioned. The flannel strainer and the osnaburgh may need rinsing occasionally during the work.

When all the pulp is pressed, put the hard cakes of pomace taken from the cloth into a tub, and pour upon them a little more soft spring water than you have clear juice; break up the balls and wash them thoroughly in the water, so as to obtain all the juice left in the mass, and then strain it clear: measure out as many gallons of this water as you have of clear juice, say five gallons of the water to five gallons of the juice, dissolve in each gallon of the water six pounds of sugar (brown or white, as you want a common or first-rate wine), and when thoroughly dissolved, add the juice (first passing it again through the strainer), and mix them. Then rinse out your cask, put it where it can stand undisturbed in a cellar; fill it perfectly full of the mixture, and lay a cloth loosely over the bung-hole. In two or three days fermentation will commence, and the impurities run over at the bung; look at it every day, and if it does not run over, with some of the mixture which you have reserved in another vessel, fill it up to the bung. In about three weeks fermentation will have ceased, and the wine be still; fill it again, drive in the bung tight, nail a tin over it, and let it remain undisturbed until the following November, or what is better, March. Then draw it off,

without shaking the cask, put it into bottles or demijohns, cork tightly and seal over.

For a ten-gallon cask, you will need about $4\frac{1}{2}$ gallons of juice, $4\frac{1}{2}$ gallons of water, and 20 pounds of sugar, and in the same proportion for larger or smaller quantities. Some persons add spirit to the wine, but instead of doing good, it is only an injury.

Another process is, after pouring in the mixture for a ten-gallon cask, to beat up the whites of two or three eggs into a froth, put them into the cask, and with a long stick mix them thoroughly with the wine. In five or six days, draw the now clarified wine off by a spigot, and without shaking the cask at all, into a clean cask, bung up and tin, to be drawn off into glass in November or March.

The more carefully your juice is strained, the better the quality of your sugar, and the more scrupulously clean your utensils, particularly your kegs, are, the purer and better will be your wine.

The best quality, when you gather your own fruit, and make it yourself, costs you only the price of the white sugar, and when bottled will cost you in money about twelve and a half cents a bottle.

WINE, BLACKBERRY, (Other Methods of Making).—1. Having procured berries that are fully ripe, put them into a tub or pan with a tap to it, and pour upon them as much boiling water as will just cover them. As soon as the heat will permit the hand to be put into the vessel, bruise them well till all the berries are broken. Then let them stand covered till the berries begin to rise toward the top, which they usually do in three or four days. Then draw off the clear liquor into another vessel, and add to every 10 quarts of this liquor 4 pounds of sugar; stir it well, and let it stand to work a week or ten days; then filter it through a flannel jelly bag into a cask. Take now 4 ounces of isinglass and lay it to steep for twelve hours in a pint of blackberry juice; the next morning boil it over a slow fire for half an hour with a quart or 3 pints more juice, and pour it into the cask; when cool, rouse it about well and leave it to settle for a few days, then rack it off into a clean cask, and bung it down.

2. The following is said to be an excellent recipe for the manufacture of a superior wine from blackberries:—Measure your berries, and bruise them; to every gallon adding 1 quart of boiling water. Let the mixture stand twenty-four hours, stirring occasionally; then strain off the liquor into a cask, to every gallon adding 2 pounds of sugar; cork tight, and let stand till the following October, and you will have wine ready for use, without any further straining or boiling, that will make lips smack, as they never smacked under similar influence before.

3. Gather when ripe, on a dry day. Put into a vessel, with the head out, and a tap fitted near the bottom; pour on them boiling water to cover them. Mash the berries with your hands, and let them stand covered till the pulp rises to the top and forms a crust, in three or four days. Then draw off the fluid into another vessel, and to every gallon add one pound of sugar; mix well, and put into a cask, to work for a week or ten days, and throw off any remaining lees, keeping the cask well filled, particularly at the commencement. When the working has ceased,

bung it down; after six to twelve months it may be bottled.

WINE, CHERRY.—1. To make 5 pints of this wine, take 15 lbs. of cherries and 2 of currants; bruise them together; mix with them $\frac{2}{3}$ of the kernels, and put the whole of the cherries, currants, and kernels into a barrel, with a quarter of a pound of sugar to every pint of juice. The barrel must be quite full; cover the barrel with vine leaves, and sand above them, and let it stand until it has done working, which will be in about three weeks; then stop it with a bung, and in two months time it may be bottled.

2. Gather the cherries when quite ripe. Pull them from their stalks, and press them through a hair sieve. To every gallon of the liquor add 2 lbs. of lump sugar finely beaten, stir all together, and put it into a vessel that will just hold it. When it has done fermenting, stop it very close for three months, and then bottle it off for use.

WINE, CIDER.—Let the new cider from sour apples, (ripe, sound fruit preferred,) ferment from 1 to 3 weeks, as the weather is warm or cool. When it has attained to a lively fermentation, add to each gallon, according to its acidity, from $\frac{1}{2}$ a lb. to 2 lbs. of white crushed sugar, and let the whole ferment until it possesses precisely the taste which it is desired should be permanent. In this condition pour out a quart of the cider and add for each gallon $\frac{1}{4}$ ounce of sulphate of lime, not sulphate. Stir the powder and cider until intimately mixed, and return the emulsion to the fermenting liquid. Agitate briskly and thoroughly for a few moments, and then let the cider settle. Fermentation will cease at once. When after a few days, the cider has become clear, draw off carefully, to avoid the sediment, and bottle. If loosely corked, which is better, it will become a sparkling cider wine, and may be kept indefinitely long.

WINE, CURRANT.—The currants should be fully ripe when picked; put them into a large tub, in which they should remain a day or two; then crush with the hands, unless you have a small patent wine press, in which they should not be pressed too much, or the stems will be bruised, and impart a disagreeable taste to the juice. If the hands are used, put the crushed fruit, after the juice had been poured off, in a cloth or sack and press out the remaining juice. Put the juice back into the tub after cleansing it, where it should remain about three days, until the first stages of fermentation are over, and removing once or twice a day the scum copiously arising to the top. Then put the juice in a vessel—a demijohn, keg, or barrel—of a size to suit the quantity made, and to each quart of juice add 3 lbs. of the best yellow sugar, and soft water sufficient to make a gallon.

Thus, ten quarts of juice and 30 lbs. of sugar will give you 10 gals. of wine, and so on in proportion. Those who do not like sweet wine can reduce the quantity of sugar to two and a half, or who wish it very sweet, raise to three and a half pounds per gallon.

The vessel must be full, and the bung or stopper left off until fermentation ceases, which will be in 12 or 15 days. Meanwhile, the cask must be filled up daily with currant juice left over, as fermentation throws out the impure matter. When fermentation ceases, rack the wine off carefully, either from the spigot or by a syphon,

and keep running all the time. Cleanse the cask thoroughly with boiling water, then return the wine, bung up tightly, and let it stand 4 or 5 months, when it will be fit to drink, and can be bottled if desired.

All the vessels, casks, etc., should be perfectly sweet, and the whole operation should be done with an eye to cleanliness. In such event, every drop of brandy or other spirituous liquors added will detract from the flavor of the wine, and will not, in the least degree, increase its keeping qualities. Currant wine made in this way will keep for an age.

WINE, CURRANT, Other Methods of Making.—1. To every pailful of currants, on the stem, put one pailful of water; mash and strain. To each gallon of the mixture of juice and water add $3\frac{1}{4}$ lbs. of sugar. Mix well, and put into your cask, which should be placed in the cellar, on the tilt, that it may be racked off in October, without stirring up the sediment. Two bushels of currants will make one barrel of wine. Four gallons of the mixture of juice and water will, after 13 lbs. of sugar are added, make 5 gals. of wine. The barrel should be filled within three inches of the bung, which must be made air tight, by placing wet clay over it after it is driven in.

2. Pick your currants when ripe on a fair day, crush them well, and to every gallon of juice add two of water and 3 lbs. of sugar—if you wish it sweeter, add another half pound of sugar—mix all together in some large vessel, then dip out into earthen jars, let it stand to ferment in some cool place, skimming it every other morning. In about ten days it will be ready to strain off; bottle and seal, or put in a cask and cork tight, the longer you keep it the better it will be.

3. Into a ten gallon keg, put 10 quarts of currant juice, 30 lbs. of sugar and fill up with water. Let it stand in a cool place, until sufficiently worked, and then bung up tight. You can let it remain in the cask, and draw out, as you want to use it.

WINE, Coloring for.—White sugar, 1 lb.; water, 1 gal.; put into an iron kettle, let boil, and burn to a red black, and thick; remove from the fire and add a little hot water to keep it from hardening as it cools; then bottle for use.

WINE, To Cool.—In the absence of ice take a bottle of wine, surround it with a piece of linen dipped in water, and place it in a draught. It will be found that the liquid in the bottle will be reduced to a temperature much below that of the surrounding air, having parted with its caloric to the vapour formed by the evaporation of the water of the cloth.

WINE, DAMSON.—Gather the fruit dry, weigh and bruise it, and to every 8 lbs. of fruit add 1 gal. of water; boil the water, pour it on the fruit scalding hot; let it stand for two days; then draw it off, put it into a clean cask, and to every gallon of liquor and $2\frac{1}{2}$ lbs. of good sugar; fill the cask. It may be bottled off after standing in the cask a year. On bottling the wine, put a small lump of loaf sugar into every bottle.

WINE, ELDERBERRY.—Take elderberry juice, 10 gals.; water, 10 gals.; white sugar, 45 pounds; red tartar, 8 ounces. These are put into a cask, a little yeast added, and the whole is fermented. When undergoing fermentation, ginger root, 4 ounces; allspice 4, and cloves 1 ounce, are put into a bag of clean cotton cloth,

and suspended in the cask. They give a pleasant flavor to the wine, which will become clear in about two months, and may be drawn off and bottled. Some add brandy to this wine, but if the fermentation is properly conducted, this is not necessary.

WINE, ELDER, (Flavored with Hops).—A lady, disliking the taste of spices in home-made wines, was induced to try the effect of flavoring elder wines with hops. The result is one of the most grateful, wholesome, and valuable beverages. Its color equals that of the finest claret; and it produces no acidity after drinking, as many home-made wines do. The berries, which must be thoroughly ripe, are to be stripped from the stalk, and squeezed to a pulp. Stir and squeeze this pulp, once every day for four days; then separate the juice from the pulp by passing through a cane sieve or basket; to every gallon of juice, add half a gallon of cold spring water; boil nine gallons with six ounces of hops for half an hour; then strain it, and boil again, with three pounds of sugar to the gallon, for about ten minutes, skimming it all the time; pour it into a cooler, and, while lukewarm, put a piece of toasted bread with a little barm on it to set it working; put it into a cask as soon as cold; when it has done working, cork it down, and leave it six months before it is tapped; it is then drinkable, but improves with age exceedingly.

WINE, To Restore when Flat.—Add four or five pounds of sugar, honey, or bruised raisins, to every hundred gallons, and bung close. A little spirits may also be added.

WINE, GRAPE.—Take two quarts of grape juice, two quarts of water, four pounds of sugar. Extract the juice of the grape in any simple way; if only a few quarts are desired, we do it with a strainer and a pair of squeezers, if a larger quantity is desired, put the grapes into a cheese press made particularly clean, putting on sufficient weight to extract the juice of a full hoop of grapes, being careful that none but perfect grapes are used, perfectly ripe and free from blemish. After the first pressing put a little water with the pulp and press a second time, using the juice of the second pressing with the water to be mixed with the clear grape juice. If only a few quarts are made place the wine as soon as mixed into bottles, filling them even full and allow to stand in a warm place until it ferment, which will take about thirty-six hours usually; then remove all the scum, cool and put into a dark, cool place. If a few gallons are desired place in a keg, but the keg must be even full, and after fermentation has taken place and the scum removed, draw off and bottle, and cork tight.

WINE, GINGER.—1. Boil together for half an hour, 7 quarts of water, 6 pounds of sugar, 2 ounces of the best ginger, bruised, and the rind of three good-sized lemons. When lukewarm put the whole into a cask, with the juice of the lemons, and $\frac{1}{4}$ of a pound of sun raisins; add 1 teaspoonful of new yeast, and stir the wine every day for ten days.

2. Water, 10 gals.; lump sugar, 20 lbs.; bruised ginger, 8 oz.; 3 or 4 eggs. Boil well and skim; then pour hot on six or seven lemons cut in sliced, macerate for two hours; then rack and ferment; next add spirits, 2 qts.; and afterwards finings, 1 pint; runnage well. To make the color, boil $\frac{1}{2}$ oz. saleratus, and $\frac{1}{2}$ oz. alum, in 1 pint of water, till you get a bright red color.

3. Take one quart of 95 per cent, alcohol, and put into it one ounce of best ginger root, (bruised and not ground,) five grains of capsicum, and one drachm of tartaric acid. Let stand one week and filter. Now add one gallon of water, in which one pound of crushed sugar has been boiled. Mix when cold. To make the color, boil $\frac{1}{2}$ oz. of cochineal, $\frac{1}{4}$ ounce of cream tartar, $\frac{1}{2}$ ounce of saleratus, and $\frac{1}{2}$ ounce alum in a pint of water till you get a bright red color.

WINE, GOOSEBERRY.—Pick and bruise the gooseberries, and to every pound, put a quart of cold spring water, and let it stand three days, stirring it twice or thrice a day. Add to every gallon of juice three pounds of loaf sugar; fill the barrel, and when it is done working, add to every twenty quarts of liquor, one quart of brandy, and a little isinglass. The gooseberries must be picked when they are just changing color. The liquor ought to stand in the barrel six months. Taste it occasionally, and bottle when the sweetness has gone off.

WINES, HOME MADE.—To secure the best results whatever fruit is chosen, currant, gooseberry, elderberry, etc., it should be gathered during fair weather, and be fully ripe, but not over ripe. If not ripe enough it will make a harsh wine and will require too much sugar to save it; if over ripe it will be dull in flavor. Next it should be picked clear of stems and damaged or green fruit. Then bruise or mash the fruit with say an instrument like an ordinary potato masher. This should be done in a vessel containing a guard, such as a piece of wire sieve, over the tap hole, so as to keep back husks and seeds when drawing off the liquor. After mashing add water in proportions hereafter to be named, and stir up well the mixture of mashed fruit and water. Let it stand thirty or forty hours, stirring every four or five hours. Now draw off the liquor through the tap hole, and gather the residue into a coarse bag and squeeze the juice out of it and add to the liquid already drawn off. The sugar, tartar, etc., are now added in a fine powder or solution, and the whole well stirred. If the weather is moderately warm fermentation soon sets in, which should go on three or four days before the new made wine is put into the cask. The bung should be left out, so that the wine can clear itself. In about a week whatever flavoring extracts are wanted can be put into the wine and in about another week the brandy or clear spirits needed to give it keeping qualities. The cask is now filled up with wine that has arrived at a similar state of ripeness and bunged tight. After four or five weeks it is tried by boring a hole about a third from the top of the heading and a gill or so drawn off to see whether it is clear. If it is not, bung it up again and let it rest, or fine it with isinglass as we will explain by-and-by. If already fine, it may be carefully drawn off by a spigot inserted so as not to drain the very bottom of the cask. The bottom may be kept for vinegar. The mashed mass or must of strongly flavored fruits such as mulberries or black currants may be boiled, but the flavors of the delicate kinds are spoiled by boiling.

The general proportions are: Fruit, four to six pounds; soft water, one gallon; sugar, three to five pounds, according to the sweetness of the juice (the juice should always be of a positive or cloying sweetness when the sugar is added); cream of tartar, one and a quarter ounces; brandy

fourth proof, two-thirds of a gill to a gallon of the wine. If the fruit is sweet, or a full proportion of sugar used, no spirit or brandy will be needed; enough alcohol will be liberated to preserve the wines. If no brandy is convenient a quarter of a gill of spirits of wine will do in its place, or a gill of bourbon whisky run through a handful of broken charcoal so as to take out the whisky flavor.

Every sweet fluid will yield a wine. Beets, parsnips, turnips, sugar, maple juice, cherry juice, wortleberry, raspberry, etc., etc. Many pleasant flavors are made by mixing two or three different kinds of fruit.

For fining or clearing the wine use a quarter of a pound of isinglass, dissolved in a portion of the wine, to a barrel. This must be put in after fermentation is over, and should be added gently at the bung hole, and managed so as to spread as much as possible over the upper surface of the liquid; the intention being that the isinglass should unite with impurities and carry them with it to be bottom.

WINE, LEMON.—Sugar, 60 pounds; raisins (bruised), 15 pounds; water, 30 gallons. Boil, then add cider, 15 gallons. Ferment, and add spirit, 3 gallons; white tartar, 12 ounces; essence of lemon, 2 ounces; finings, 1 pint. Observe to shake the essence, with a pint of the spirit, until it becomes milky, before adding it to the wine.

WINE, MADEIRA.—To 40 gallons prepared cider, add, $\frac{1}{4}$ lb. tartaric acid; 4 gallons spirits; 3 lbs. loaf sugar. Let it stand 10 days, draw it off carefully; fine it down, and again rack it into another cask.

WINE, MORELLA.—Take the juice of Morella or tame cherries, and to each quart put three quarts of water and four pounds of coarse brown sugar; let them ferment and skim until worked clear; then draw off, avoiding the sediment at the bottom. Bung up, or bottle, which is best for all wines, letting the bottles lie always on the side, either for wines or beers.

WINE, MULBERRY.—The mulberries ought to be gathered when they are just turning from red to black, and when they are quite free from dew or moisture. When gathered, let them be spread loose on a cloth or a clean floor, and let them lie for twenty-four hours. Then, having put them into a proper vessel, squeeze out the juice, and drain it off from the seeds. Then boil a gallon of water for each gallon of juice; skim the water, and add some cinnamon slightly bruised. To each gallon add six ounces of white sugar-candy finely powdered. Skim and strain when the liquor is settled, and add to it more of the juice. To every gallon of the liquor add a pint of white or Rhenish wine. Let it stand to settle in the cask five or six days, then draw it off and keep it in a cool place.

WINE, PARSNIP.—Take fifteen pounds of sliced parsnips, and boil until quite soft in five gallons of water; squeeze the liquor well out of them, run it through a sieve, and add three pounds of coarse lump sugar to every gallon of liquor. Boil the whole for three-quarters of an hour. When it is nearly cold, add a little yeast on toast. Let it remain in a tub for ten days, stirring it from the bottom every day; then put it into a cask for a year. As it works over, fill it up every day.

WINE, (Poor.) To Improve.—Poor wines may be improved by being racked off, and re-

turned to the cask again; and then putting into the wine about 1 lb. of jar or box raisins, bruised, and 1 quart of brandy.

Or, put into the wine 2 lbs. of honey, and a pint or two of brandy. The honey and brandy to be first mixed together.

Or, draw off 3 or 4 quarts of such wine and fill the cask up with strong wine.

WINE, (British) PORT.—1. Damson juice, 20 gallons; cider, 20 gallons; sloe juice, 1 pound; sugar, 10 pounds; honey, 10 pounds. Ferment, then add spirit, 3 gallons; red cape, 10 gallons; red tartar (dissolved), $\frac{3}{4}$ pound; powder of catechu, $\frac{3}{4}$ pound; bruised ginger, 1 ounce; cassia, 1 ounce; cloves, $\frac{1}{2}$ ounce. Mix well with brandy coloring, 1 pint, and fine with bullock's blood.

2. Bullace, 8 pounds; damsons, 40 pounds; water, 6 gallons. Boil the water, skim it, and pour it boiling hot on the fruit; let it stand four or six days at least. During that time bruise the fruit or squeeze it with your hands. Then draw or pour it off into a cask, and to every gallon of liquor put two pounds and a half of fine sugar, or rather more: put some yeast on a slice of bread (warm) to work it. When done working, put a little brandy into the cask and fill it up. Bung it up close, and let stand six or twelve months: then bottle it off. The quantity of bullace should be one pound to every five of damsons. This wine is nearer in flavour to port than any other: if made with cold water, it will be equally as good, but of a different color.

3. Red cape, 100 gallons; sloe juice, 1 gallon; honey, 12 pounds; rough cider, 21 gallons; bruised cochineal, 4 ounces; brandy coloring, 1 pint; spirit, 6 gallons; bruised bitter almonds, $\frac{1}{2}$ ounce; cloves, $\frac{1}{2}$ ounce; powdered catechu, 1 pound; red tartar, 1 pound. Mix well, and fine down with bullock's blood.

4. Cider, 25 gallons; elder juice, 5 gallons; port wine, 5 gallons; brandy, 1 gallon; red tartar, 6 ounces; catechu, 2 ounces; finings, 1 quart; logwood, 1 pound. Well mix and bung close.

WINE, PORT.—1. To 40 gals. prepared cider add 6 gals. good port wine; 10 quarts wild grapes, (clusters); $\frac{1}{2}$ lb. bruised rhatany root. 3 oz. tincture of kino; 3 lbs. loaf sugar; 2 gals. spirits. Let this stand ten days; color if too light, with tincture of rhatany, then rack it off and fine it. This should be repeated until the color is perfect and the liquid clear.

2. Worked cider, 42 gallons; good port wine, 12 gallons; good brandy, 3 gallons; pure spirits, 6 gallons. Mix. Elderberries and sloes, and the fruit of the black hawes, make a fine purple color for wines, or use burnt sugar.

WINE, QUINCE.—Quinces (sliced), 12 in number; boil for a quarter of an hour, in water, 1 gallon; then add lump-sugar, 2 pounds. Ferment, and add lemon wine, 1 gallon; spirit, 1 pint.

WINE, RASIN.—Raisins, 5 cwt.; water, 100 gallons. Put them into a cask. Mash for a fortnight, frequently stirring, and leave the bung loose until the active fermentation ceases, then add brandy, 5 gallons. Well mix, and let it stand till fine. The quantity of raisins and brandy may be altered to suit.

WINE, RASPBERRY.—Take three pounds of raisins, wash, clean, and stone them thoroughly; boil two gallons of spring water for half

an hour; as soon as it is taken off the fire pour it into a deep stone jar, and put in the raisins, with six quarts of raspberries and 2 lbs. of loaf sugar; stir it well together, and cover them closely, and set it in a cool place; stir it twice a day, then pass it through a sieve; put the liquor into a close vessel, adding 1 lb. more loaf sugar; let it stand for a day and night to settle, after which bottle it, adding a little more sugar.

WINE, RHUBARB.—To each gal. of juice, add 1 gal. of soft water in which 7 lbs. of brown sugar has been dissolved; fill a keg or a barrel with this proportion, leaving the bung out, and keep it filled with sweetened water as it works over until clear; then bung down or bottle as you desire.

These stalks will furnish about three-fourths their weight in juice, or from sixteen hundred to two thousand gallons of wine to each acre of well cultivated plants. Fill the barrels and let them stand until spring, and bottle, as any wine will be better in glass or stone.

WINE, To Remove Ropiness from.—Add a little catechu or a small quantity of the bruised berries of the mountain ash.

WINE, To make Settle Well.—Take a pint of wheat and boil it in a quart of water till it bursts and becomes soft; then squeeze through a linen cloth, and put a pint of the liquor into a hoghead of unsettled white wine; stir it well about, and it will become fine.

WINE, SHERRY.—To 40 gals. prepared cider, add 2 gals. spirits; 3 lbs. of raisins; 6 gals. good sherry, and $\frac{1}{2}$ oz. oil bitter almonds, (dissolved in alcohol.) Let it stand 10 days, and draw it off carefully; fine it down and again rack it into another cask.

WINE, LONDON SHERRY.—Chopped raisins, 400 lbs.; soft water, 100 gals.; sugar, 45 lbs.; white tartar, 1 lb.; cider, 16 gals. Let them stand together in a close vessel one month; stir frequently. Then add of spirits 8 gals.; wild cherries, bruised, 8 lbs. Let them stand 1 month longer, and fine with isinglass.

WINE, To Restore, when Sour or Sharp.—1. Fill a bag with leek-seed, or of leaves or twisters of vine, and put either of them to infuse in the cask.

2. Put a small quantity of powdered charcoal in the wine, shake it, and after it has remained still for 48 hours decant steadily.

WINE, STRAWBERRY.—Bruised strawberries, 12 gals.; cider, 10 gals.; water, 7 gals.; sugar, 25 lbs. Ferment, then add of bruised orris root, bruised bitter almonds, and bruised cloves, each $\frac{1}{2}$ oz.; dissolved red tartar, 6 oz.

WINE, TOMATO.—Take ripe, fresh tomatoes, mash very fine, strain through a fine sieve, sweeten with good sugar to suit the taste, set it away in an earthen or glass vessel, nearly full, cover tight, with the exception of a small hole for the refuse to work off through during its fermentation. When it is done fermenting, it will become pure and clear. Then bottle, and cork tight. A little salt improves its flavor; age improves it.

WINE, TURNIP.—Take a large number of turnips, pare and slice them; then place them in a cider-press, and obtain all the juice you can. To every gal. of juice add 3 lbs. of lump sugar, and half a pint of brandy. Pour into a cask, but do not bung until it has done working; then bung it close for three months, and draw off into

another cask; when it is fine, bottle, and cork well.

WINE, UNFERMENTED.—Gather the grapes when well ripened. Carefully remove all decayed and unripe berries. Mixed varieties, or any one of the favorite varieties of grapes may be used. Press out the juice and boil as long as any scum rises. Skim carefully from time to time. Do not boil to exceed an hour. Bottle while hot, and seal either in glass bottles, jugs, or air-tight casks. It is fit for use at any time, but after being opened it must not be allowed to ferment. Excepting strawberry syrup, this will be found the most delightful and exhilarating of all unfermented beverages. It needs no sugar, and may be reduced when drank.

WINE, To Remove the Taste of the Cask from.—Finest oil of olives, 1 lb. Put it into the hoghead, bung close, and roll it about, or otherwise well agitate it, for 3 or 4 hours, then gib and allow it to settle. The olive oil will gradually rise to the top and carry the ill flavor with it.

WINE, To Flavor.—When the vinous fermentation is about half over, the flavoring ingredients are to be put into the vat and well stirred into the contents. If almonds form a component part, they are first to be beaten to a paste and mixed with a pint or two of the must. Nutmegs, cinnamon, ginger, seeds, etc., should, before they are put into the vat, be reduced to powder, and mixed with some of the must.

WINE, To Mellow.—Wine, either in bottle or wood, will mellow much quicker when only covered with pieces of bladder well secured, than with corks or bungs. The bladder allows the watery particles to escape, but is impervious to alcohol.

WINE, To Convert White into Red.—Put 4 ounces of turnsole rags into an earthen vessel, and pour upon them a pint of boiling water; cover the vessel close, and leave it to cool; strain off the liquor, which will be of a fine deep red, inclining to purple. A small portion of this colors a large quantity of wine. This tincture may either be made in brandy, or mixed with it, or else made into a syrup, with sugar, for keeping.

In those countries which do not produce the tingeing grape which affords a blood-red juice, wherewith the wines of France are often stained, in defect of this the juice of elderberries is used, and sometimes logwood is used at Oporto.

WOOD, To Remove the Taste of when New.—A new keg, churn, bucket, or other wooden vessel, will generally communicate a disagreeable taste to anything that is put into it. To prevent this inconvenience, first scald the vessel well with boiling water, letting the water remain in it till cold; then dissolve some pearlash or soda in lukewarm water, adding a little lime to it, and wash the inside of the vessel well with this solution. Afterwards scald it well with plain hot water, and rinse it with cold water before you use it.

WOODEN TAPS AND FAUCETS, To Prevent Cracking.—This is best prevented by putting the taps and faucets in melting paraffine, and heating them before at a temperature of 212° F. until bubbles of air cease to escape from the wood. The whole is then allowed to cool to about 120° F., when the taps are taken from the bath and cleaned from the adhering paraffine by rubbing with a dry coarse piece of cloth.

WORKERS IN GLASS.

AMALGAM for MIRRORS.—Lead and tin of each 2 oz.; bismuth 2 oz.; mercury 4 ounces. Add the mercury to the rest in a melted state and removed from the fire; mix well with an iron rod.

This amalgam melts at a low heat, and is employed for silvering the insides of hollow glass vessels, globes, convex mirrors, etc. The glass being well cleaned, is carefully warmed, and the amalgam, rendered fluid by heat, is then poured in, and the vessel turned round and round, so that the metal may be brought in contact with every part of the glass, which it is desired to cover. At a certain temperature this amalgam readily adheres to glass.

BREAK (To) GLASS in any Required way.—Dip a piece of worsted thread in spirits of turpentine, wrap it round the glass in the direction required to be broken, and then set fire to the thread, or apply a red hot wire round the glass, and if it does not immediately crack, throw cold water on it while the wire remains hot. By this means glass that is broken may often be fashioned and rendered useful for a variety of purposes.

BOREING HOLES in Glass.—Any hard steel tool will cut glass with great facility when kept freely wet with camphor dissolved in turpentine. A drill-bow may be used, or even the hand alone. A hole bored may be readily enlarged by a round file. The ragged edges of glass vessels may also be thus easily smoothed by a flat file. Flat window glass can readily be sawed by a watch spring saw by aid of this solution. In short, the most brittle glass can be wrought almost as easily as brass by the use of cutting tools kept constantly moist with camphorized oil of turpentine.

COLORS, To Paint with upon Glass.—The several sorts of colors, ground in oil for this purpose, may be had at all the color-shops, etc.

Whites.—Flake white, podium.

Blacks.—Lampblack, ivory-black.

Browns.—Spanish brown, umber, spruce ochre, Dutch pink, orpiment.

Blues.—Blue bice, Prussian blue.

Reds.—Rose-pink, vermilion, red-lead, Indian-red, lake cinnabar.

Yellows.—English pink, masticot, English ochre, Saunders blue, smalt.

Greens.—Verdigris, terra vert, verditer.

The ultramarine for blue, and the carmine for red, are rather to be bought in powders, as in that state they are less apt to dry; and as the least tint of these will give the picture a cast, mix up what is wanted for present use with a drop or two of nut-oil upon the pallet with the pallet-knife.

Then lay a sheet of white paper on the table, and taking the picture in the left hand, with the turpentine side next you, hold it sloping (the bottom resting on the white paper), and all outlines and tints of the prints will be seen on the glass; and nothing remains but to lay on the colors proper for the different parts, as follows:

As the lights and shades of the picture open, lay the lighter colors first on the lighter parts of the print, and the darker over the shaded parts;

and having laid on the brighter colors, it is not material if the darker sorts are laid a little over them; for the first color will hide those laid on afterwards. For example:

Reds.—Lay on the first red-lead, and shade with lake or carmine.

Yellows.—The lightest yellow may be laid on first, and shaded with Dutch pink.

Blues.—Blue bice, or ultramarine, used for the lights, may be shaded with indigo.

Greens.—Lay on verdigris first, then a mixture of that and Dutch pink. This green may be lightened by an addition of Dutch pink.

When any of these are too strong, they may be lightened, by mixing white with them upon the pallet; or darken them as much as required by mixing them with a deeper shade of the same color.

The colors must not be laid on too thick; but if troublesome, thin them before using them, with a little turpentine oil.

Take care to have a pencil for each color, and never use that which has been used for green, with any other color without first washing it well with turpentine oil, as that color is apt to appear predominant when the colors are dry.

Wash all the pencils, after using, in turpentine oil.

The glass, when painted, must stand 3 or 4 days free from dust before it is framed.

COLORS for Grounds on Glass.—Take iron-filings and Dutch yellow beads, equal parts. If a little red cast is wanted, add a little copper filings. With a steel muller grind these together on a thick and strong copper plate, or on porphyry. Then add a little gum arabic, borax, common salt, and clear water. Mix these with a little fluid, and put the composition in a phial for use.

When it is to be used there is nothing to do but, with a hair pencil, to lay it quite flat on the design drawn the day before; and having left this to dry also for another day, with the quill of a turkey, the nib unsplit, heighten the lights in the same manner as with crayons on blue paper. Whenever there are more coats of the above composition put one upon another, the shade will naturally be stronger; and when this is finished, lay the colors for garments and complexions.

COLOR, LAKE (For Glass).—Grind the lake with water impregnated with gum and salt; then make use of it with the brush. The shading is operated by laying a double, treble, or more coats of the color, where it is wanted darker.

COLOR, BLUE PURPLE.—Make a compound of lake and indigo, ground together with gum and salt water, and use it as directed in the preceding article.

COLOR, GREEN.—Mix with an proportionable quantity of gamboge ground together as above.

COLOR, YELLOW.—Grind gamboge with salt water only.

CROWN WINDOW-GLASS.—Take of white sand, 60 lbs.; of purified pearlash, 30 lbs.; of saltpetre, 15 lbs.; of borax, 1 lb.; and of arsenic, $\frac{1}{2}$ lb.

This will be very clear and colorless if the ingredients be good, and will not be very dear. It will run with a moderate heat; but if it be desired to be yet more fusible and soft, $\frac{1}{2}$ lb. or a pound more of arsenic may be added.

If the glass should prove yellow, the manganese must be used as above directed for the looking-glass.

CUTTING GLASS.—The cutting of glass, says the Technologist, is an operation so frequently put in practice in the laboratory, that any simple method of effecting it is sure to run the rounds of the press as soon as published. Almost all the methods in common use are very old. Of course, for cutting flat glass, such as window panes, the diamonds is the best agent. For cutting rounds, or ovals, out of flat glass, the diamond is the best tool; and, if the operator has no diamond, it will always pay to carry the job to a glazier, rather than waste time and make a poor job by other and inferior means. When, however, it is required to cut off a very little from a circle or oval, the diamond is not available, except in very skillful hands. In this case, a pair of pliers, or very dull scissors, in the best tool, and the cutting is best performed under water. A little practice will enable the operator to shape a small round, or oval, with great rapidity, ease, and precision. When bottles or flasks are to be cut, the diamond is still the best tool in skillful hands; but ordinary operators will succeed best with pastiles, or a red hot poker. We prefer the latter, as being the most easily obtained, and the most efficient; and we have never found any difficulty in cutting off broken flasks so as to make dishes, or to carry a cut spirally round a long bottle, so as to cut it in the form of a corkscrew. And, by the way, when so cut, glass exhibits considerable elasticity, and the spiral may be elongated like a ringlet. The process is very simple. The line of the cut should be marked by chalk, or by pasting a thin strip of paper alongside of it; then make a file mark to commence the cut; apply the hot iron, and a crack will start; and this crack will follow the iron wherever we choose to lead it.

For drilling holes in glass, a common steel drill, well made and tempered, is the best tool. The steel should be worked at a low temperature, so as to be sure not to burn it, and then tempered as hard as possible, in either mercury or a bath of salt water that has been well boiled. Such a drill will go through glass very rapidly, if kept well moistened. A good liquid for moistening such drills is turpentine in which some camphor has been dissolved. This was the lubricator recommended by Griffin in his work on chemical manipulation, and it has been frequently published since. Dilute sulphuric acid is equally good, if not better; and we have found carbolic acid singularly efficient.

DRAWING ON GLASS.—Grind lampblack with gum-water and some common salt. With a pen or hair-pencil, draw the design on the glass, and afterwards shade and paint as already given elsewhere.

ENGRAVINGS, To Transfer on Glass.—Metallic colors prepared and mixed with fat oil, are applied to the stamp on the engraved plate. Wipe with the hand in the manner of the printers of colored plates; take a proof on a sheet of silver paper, which is immediately transferred on the tablet of glass destined to be painted, being

careful to turn the colored side against the glass; it adheres to it, and as soon as the copy is quite dry, take off the superfluous paper by washing it with a sponge; there will remain only the color transferred to the glass; it is fixed by passing the glass through the ovens.

ETCHING on Glass.—Druggist bottles, bar-tumblers, signs, and glassware of every description, can be lettered in a beautiful style of art, by simply giving the article to be engraved, or etched, a thin coat of the engraver's varnish, and the application of fluoric acid. Before doing so, the glass must be thoroughly cleaned and heated, so that it can hardly be held. The varnish is then to be applied lightly over, and made smooth by dabbing it with a small ball of silk, filled with cotton. When dry and even, the lines may be traced on it by a sharp steel, cutting clear through the varnish to the glass. The varnish must be removed clean from each letter, otherwise it will be an imperfect job. When all is ready, pour on or apply the fluoric acid with a feather, filling each letter. Let it remain until it etches to the required depth, then wash off with water, and remove the varnish.

FLINT-GLASS.—Take of white sand, 120 lbs.; red-lead, 50 lbs.; the best pearlash, 40 lbs.; nitre, 20 lbs.; manganese, 5 oz.

If the composition be fused with a very strong fire, and time be given to it, a glass will be produced that will have the play of the best flint-glass, and yet be hard and strong. It is not so cheap as other compositions, where arsenic or common salt is introduced, or where more of the pearlash are used; in either of which cases, savings may be made by diminishing proportionably the quantities of nitre. But the qualities of this glass will be found to come nearer to the standard of perfection, which is to unite the lustre and hardness together in the greatest degree they are compatible with each other.

Frit, To Make.—Frit, in the glass manufacture, is the matter or ingredients of which glass is to be made, when they have been calcined or baked in a furnace. There are three kinds of frit: the first, crystal frit, or that for crystal or clear glass, is made with salt of pulverine and sand. The second and ordinary frit is made of the bare ashes of the pulverine or barilla, without extracting the salt from them. This makes the ordinary white or crystal-glass. The third is frit for green glasses, made of common ashes, without any preparation. This last frit will require 10 or 12 hours baking. The materials in each are to be finely powdered, washed and seared; then equally mixed, and frequently stirred together in the melting-pot.

GILD, (To) Glass and Porcelain.—Drinking and other glasses are sometimes gilt on their edges. This is done, either by an adhesive varnish, or by heat. The prepared by dissolving in boiled linseed-oil an equal weight either of copal or amber. This is to be diluted by a proper quantity of oil of turpentine, so as to be applied as thin as possible to the parts of the glass intended to be gilt. When this is done, which will be in about 24 hours, the glass is to be placed in a stove, till it is so warm almost to burn the fingers when handled. At this temperature the varnish will become adhesive, and a piece of leafgold, applied in the usual way, will immediately stick. Sweep off the superfluous portions of the leaf; and when quite cold it may be burn-

ished, taking care to interpose a piece of very thin paper (Indian paper) between the gold and the burnisher. If the varnish is very cold, this is the best method of gilding glass, as the gold is thus fixed on more evenly than in any other way.

GLASS for LOOKING-GLASS PLATES.

—1. Take of white sand, cleansed, 60 lbs.; of purified pearlash, 25 lbs.; of saltpetre, 15 lbs.; and of borax, 7 lbs.

This composition should be continued long in the fire, which should be for some time strong, and afterwards more moderate, that the glass may be entirely free from bubbles before it is working. It will be entirely clear of all color, unless in case of some accident; but if any yellow tinge should, nevertheless unfortunately infect it, there is no remedy except by adding a small proportion of manganese, which should be mixed with an equal quantity of arsenic, and after their being put into the glass, giving it a considerable heat again, and then suffering it to free itself from bubbles in a more moderate one, as before. If the tinge be slight, an ounce of manganese may be first tried, and if that prove insufficient, the quantity must be increased, but the glass will always be obscure in proportion to the quantity that is admitted.

2. Take of the white sand, 60 lbs.; of pearlash, 20 lbs.; of common salt, 10 lbs.; of nitre, 7 lbs.; and of borax, 1 lb.

This glass will run with a little heat as the former, but it will be more brittle and refract the rays of the light in a greater degree.

GREEN BOTTLE-GLASS.—1. Take of wood-ashes, 200 lbs.; and of sand, 100 lbs. Mix them thoroughly by grinding together.

This is the due proportion where the sand is good and the wood-ashes are used without any other addition.

2. Take of wood-ashes, 170 lbs.; of sand, 100 lbs.; and of scoria, or clinkers, 50 lbs. Mix the whole well by grinding them together.

The clinkers should be well ground before they are used, if they admit of it; but frequently they are too hard, and in that case they should be broken into as small bits as can be done conveniently and mixed with the other matter without any grinding. The harder they are, the less material will be the powdering of them as they will the sooner melt of themselves in the furnace, and consequently mix with the other ingredients.

GREEN PHIAL-GLASS (Common).—Take of the cheapest kind of white sand, 120 lbs.; of wood-ashes, well burnt and sifted, 80 lbs.; of pearlash, 20 lbs.; of common salt, 15 lbs.; and of arsenic, 1 lb.

This will be green, but tolerably transparent and will work with a moderate fire, and vitrify quickly with a strong one.

GREEN WINDOW-GLASS.—1. Take of white sand 60 lbs.; of unpurified pearlash, 30 lbs.; of common salt, 10 lbs.; of arsenic, 2 lbs.; and of manganese 2 oz. This is a cheap composition and will not appear too green nor be very deficient in transparency.

2. Take of the cheapest kind of white sand, 120 lbs.; of unpurified pearlash, 30 lbs.; of wood-ashes, well burnt and sifted, 60 lbs.; of common salt, 20 lbs.; and of arsenic, 5 lbs. This composition is very cheap, and will produce a good glass with a greenish cast.

LUTES.—Lutes are compositions which are

employed to defend glass and other vessels, from the action of fire, or to fill up the vacancies which occur, when separate tubes, for the necks of different vessels, are inserted into each other during the process of distillation. Those lutes which are exposed to the action of fire, are usually called fire-lutes.

For a very excellent fire-lute, which will enable glass vessels to sustain an incredible degree of heat, take fragments of porcelain, pulverise and sift them well, and add an equal quantity of fine clay, previously softened with as much of a saturated solution of muriate of soda, as is requisite to give the whole a proper consistence. Apply a thin and uniform coat of this composition to the glass vessels, and allow it to dry slowly before they are put in on the fire.

Equal parts of coarse and refractory clay mixed with a little hair, form a good lute.

Fat earth, beaten up with fresh horse-dung, Chaptal recommends as an excellent fire-lute, which he generally used, and the adhesion of which was such, that after the retort had cracked, the distillation could be carried on and regularly finished.

Lutes for the joining of such vessels as retorts and receivers, are varied according to the nature of the vapors which will act against them, in order not to employ a more expensive and troublesome composition than the case requires. For resisting watery vapors, slips of wet bladder, or slips of wet paper or linen, covered with stiff flour paste, may be bound over the juncture.

A closer and neater lute for more penetrating vapors, is composed of whites of eggs made into a smooth paste with quick-lime, and applied upon strips of linen. The quick-lime should be previously slacked in the air, and reduced to a fine powder. The cement should be applied the moment it is made; it soon dries, becomes very firm; and is in chemical experiments one of the most useful cements known.

Where saline, acrid vapors are to be resisted, a lute should be composed of boiled linseed oil intimately mixed with clay, which has been previously dried, finely powdered, and sifted. This is called fat lute. It is applied to the junctures, as the undermost layers, and is secured in its place by the white of egg lute last mentioned, which is tied on with packthread.

MANUFACTURE OF GLASS.—Glass is a combination of sand, flint, spar, or some other silicious substance, with one or other of the fixed alkalies, and in some cases with a metallic oxide. Of the alkalies, soda is commonly preferred; and of the silicious substances, white sand is most in repute, as it requires no preparation for coarse goods, while more washing in water is sufficient for those of a finer quality. The metallic oxide usually employed, is litharge, or some other preparation of lead. Iron is used in bottle glass.

The silicious matter should be fused in contact with something called a flux. The substances proper for this purpose are lead, borax, arsenic, nitre or any alkaline matter. The lead is used in the state of red-lead; and the alkalies are soda, pearlash, seasalt, and wood-ashes. When red-lead is used alone, it gives the glass a yellow cast, and requires the addition of nitre to correct it. Arsenic, in the same manner, if used in excess, is apt to render the glass milky. For a perfectly transparent glass, the pearlash is found much superior to lead; perhaps better than any

other flux, except it be borax, which is too expensive to be used, except for experiments, or for the best looking-glasses.

The materials for making glass must first be reduced to powder, which is done in mortars or by horse mills. After sifting out the coarse parts, the proper proportions of siliceous sand and flux are mixed together, and put into the calcining furnace, where they are kept in a moderate heat for 5 or 6 hours, being frequently stirred about during the process. When taken out the water is called frit. Frit is easily converted into glass by only pounding it, and vitrifying it in the melting pots of the glass furnace; but in making fine glass, it will sometimes require a small addition of flux to the frit to correct any fault. For, as the flux is the most expensive article, the manufacturer will rather put too little at first than otherwise, as he can remedy this defect in the melting pot. The heat in the furnace must be kept up until the glass is brought to a state of perfect fusion; and during this process any scum which arises must be removed by ladles. When the glass is perfectly melted, the glass-blowers commence their operations.

For the best flint-glass, 120 lbs. of white sand, 50 lbs. of red-lead, 40 lbs. of the best pearlash, 20 lbs. of nitre, and 5 oz. of manganese; if a pound or two of arsenic be added, the composition will fuse much quicker, and with a lower temperature.

For a cheaper flint-glass, take 120 lbs. of white sand, 35 lbs. of pearlash, 40 lbs. of red-lead, 13 lbs. of nitre, 6 lbs. of arsenic, and 4 oz. of magnesia.

This requires a long heating to make clear glass, and the heat should be brought on gradually, or the arsenic is in danger of subliming before the fusion commences. A still cheaper composition is made by omitting the arsenic in the foregoing, and substituting common sea-salt.

For the best German crystal-glass, take 120 lbs. of calcined flints or white sand, the best pearlash, 70 lbs.; saltpetre, 10 lbs.; arsenic, $\frac{1}{2}$ lb.; and 5 oz. of manganese. Or, a cheaper composition for the same purpose is 120 lbs. of sand or flints, 46 lbs. of pearlash, 7 lbs. of nitre, 6 lbs. of arsenic, and 5 oz. of manganese. This will require a long continuance in the furnace; as do all others where much of the arsenic is employed.

For looking-glass plates, washed white sand, 60 lbs.; purified pearlash, 25 lbs.; nitre, 15 lbs.; and 7 lbs. of borax. If properly managed, this glass will be colorless. But if it should be tinged by accident, a trifling quantity of arsenic, and an equal quantity of manganese, will correct it; an ounce of each may be tried first, and the quantity increased if necessary.

The ingredients for the best crown-glass must be prepared in the same manner as for looking-glasses, and mixed in the following proportions: 60 lbs. of white sand, 30 lbs. of pearlash, and 15 lbs. of nitre, 1 lb. of borax, and $\frac{1}{2}$ lb. of arsenic.

The composition for common green window-glass is, 120 lbs. of white sand, 30 lbs. of unpurified pearlash; wood-ashes, well burnt and sifted, 60 lb.; common salt, 20 lbs.; and 5 lbs. of arsenic.

Common green bottle-glass is made from 200 lbs. of wood-ashes, and 100 lbs. of sand; or 170 lbs. of ashes, 100 lbs. of sand, and 50 lbs. of the

slag of an iron furnace; these materials must be well mixed.

The materials employed in the manufacture of glass, are by chemists reduced to three classes, namely, alkalies, earths, and metallic oxides.

The fixed alkalies may be employed indifferently; but soda is preferred in this country. The soda of commerce is usually mixed with common salt, and combined with carbonic acid. It is proper to purify it from both of these foreign bodies before using it. This, however, is seldom done.

The earths are silica (the basis of flints), lime, and sometimes a little alumina (the basis of clay). Silica constitutes the basis of glass. It is employed in the state of fine sand or flints; and sometimes for making very fine glass, rock crystal is employed. When sand is used, it ought, if possible, to be perfectly white, for when it is colored with metallic oxides, the transparency of the glass is injured. Such sand can only be employed for very coarse glasses. It is necessary to free the sand from all the loose earthy particles with which it may be mixed, which is done by washing it well with water.

Lime renders glass less brittle, and enables it to withstand better the action of the atmosphere. It ought in no case to exceed the 20th part of the silica employed, otherwise it corrodes the glass pots. This indeed may be prevented by throwing a little clay into the melted glass; but in that case a green glass only is obtained.

The metallic oxides employed are the red oxide of lead or litharge, and the white oxide of arsenic. The red oxide of lead, when added in sufficient quantity, enters into fusion with silica, and forms a milky hue like the dial-plate of a watch. When any combustible body is present, it is usual, in some manufactories, to add a little white oxide of arsenic. This supplying oxygen, the combustible is burnt, and flies off, while the revived arsenic is at the same time volatilized.

There are several kinds of glass adapted to different uses. The best and most beautiful are the flint and the plate-glass. These, when well made, are perfectly transparent and colorless, heavy and brilliant. They are composed of fixed alkali, pure silicious sand, calcined flints and litharge, in different proportions. The flint glass contains a large quantity of oxide of lead, which by certain processes is easily separated. The plate glass is poured in the melted state upon a table covered with copper. The plate is cast $\frac{1}{2}$ an inch thick or more, and is ground down to a proper degree of thickness, and then polished.

Crown-glass, that used for windows, is made without lead, chiefly of fixed alkali fused with silicious sand, to which is added some black oxide of manganese, which is apt to give the glass a tinge of purple.

Bottle-glass is the coarsest and cheapest kind, in this little or no fixed alkali enters the composition. It consists of alkaline earth and oxide of iron combined with alumina and silica. In this country it is composed of sand and the refuse of the soap-boiler, which consists of the lime employed in rendering this alkali caustic, and of the earthy matters with which the alkali was contaminated. The most fusible is flint-glass, and the least fusible is bottle-glass.

MARBLE (To) a Globe Glass.—Grind well on a stone, minium for red, turmeric, or rather cerussa citrina, for yellow, smalt for blue, verdigris for green, ceruse, or chalk, for white. Work

each in oil separate, and with a hog's hair pencil, single or mixed, as you think fit, scatter the same into the glass, and roll it, or dispose the colors, as you like. Then, last of all, fling a little mead amongst them, which covers all. For the Magic Lantern, paint the glasses with transparent colors, tempered with oil of spike.

PACKING Glass or China.—Procure some soft straw or hay to pack them in, and, if they are to be sent a long way and are heavy, the hay or straw should be a little damp, which will prevent them slipping about. Let the largest and heaviest things be always put undermost in the box or hamper. Let there be plenty of straw, and pack the articles tight; but never attempt to pack up glass or China which is of much consequence, till it has been overlooked by some one used to the job. The expense will be but trifling to have a person to do it who understands it, and the loss may be great, if articles of much value are packed up in an improper manner.

PAINT (To) and STAIN Glass and Porcelain.—1. To paint upon glass is an art which has generally appeared difficult; yet there is no representation more elegant than that of a mezzotinto painted in this manner, for it gives all the softness that can be desired in a picture, and is easy to work, as there are no outlines to draw, nor any shades to make.

The prints are those done in mezzotinto; for their shades being rubbed down on the glass, the several lines, which represent the shady part of any common print, are by this means blended together, and appear as soft and united as in any drawing of Indian-ink.

Provide such mezzotintos as are wanted; cut the margin; then get a piece of fine crown-glass, the size of the print, and as flat and free from knots and scratches as possible; clean the glass and lay some Venice turpentine, quite thin and smooth, on one side, with a brush of hog's hair. Lay the print flat in water, and let it remain on the surface till it sinks, it is then damp enough; take it carefully out, and dab it between some papers, that no water may be seen, yet so as to be damp.

Next lay the damp print with its face uppermost upon a flat table; then hold the glass over it, without touching the turpentine, till it is exactly even with the print, let it fall gently on it. Press the glass down carefully with the fingers in several parts, so that the turpentine may stick to the print; after which take it up, then holding the glass towards you, press the prints with the fingers, from the centre towards the edges, till no blisters remain.

When this is done, wet the back of the paint with a sponge, till the paper will rub off with the fingers; then rub it gently, and the white paper will roll off, leaving the impression only upon the glass; then let it dry, and, with a camel's hair pencil, dipped in oil of turpentine, wet it all over, and it will be perfectly transparent, and fit for painting.

2. The first thing to be done, in order to paint, or stain glass in the modern way, is to design, and even color the whole subject on paper. Then choose such pieces of glass as are clean, even, and smooth, and proper to receive the several parts. Proceed to distribute the design itself, or the paper it is drawn on, into pieces suitable to those of the glass; always taking care that the glasses may join in the contours of the figures,

and the folds of the draperies; that the carnations and other finer parts may not be impaired by the lead with which the pieces are to be joined together. The distribution being made, mark all the glasses, as well as papers, that they may be known again; which done, apply every part of the design upon the glass intended for it; and copy or transfer the design upon the glass with the black color diluted in gum-water, by tracing and following all the lines and strokes that appear through the glass, with the point of a pencil.

When these strokes are well dried, which will be in about 2 days (the work being only in black and white), give it a slight wash over with urine, gum-arabic, and a little black; and repeat this several times, according as the shades are desired to be heightened, with this precaution, never to apply a new wash till the former is sufficiently dried. This done, the lights and risings are given by rubbing off the color in the respective places with a wooden point, or by the handle of the pencil.

The colors are used with gum-water, the same as in painting in miniature, taking care to apply them lightly, for fear of effacing the outlines of the design; or even, for the greater security, to apply them on the other side; especially yellow, which is very pernicious to the other colors, by blending therewith. And here too, as in pieces of black and white, particular regard must always be had not to lay color on color, till such time as the former is well dried.

When the painting of all the pieces is finished, they are carried to the furnace to anneal, or to bake the colors.

PHIAL-GLASS (Best).—Take of white sand, 120 lbs.; of unpurified pearlash, 50 lbs.; of common salt, 10 lbs.; of arsenic, 5 lbs.; and of manganese, 5 oz.

This will be a very good glass for the purpose and will work with a moderate heat, but requires time to become clear, on account of the proportion of arsenic; when, however, it is once in good condition, it will come very near to the crystal glass.

PRINCE RUPERT'S DROPS.—Prince Rupert's drops are made by letting drops of melted glass fall into cold water; the drops assumed by that means an oval form, with a tail or neck resembling a retort. They possess this singular property, that if a small portion of the tail is broken off, the whole bursts into powder, with an explosion, and a considerable shock is communicated to the hand that grasps it.

POLISHING and GRINDING Glass.—To grind plate-glass, lay it horizontally upon a flat stone table, made of a very fine grained free-stone; and for its greater security, plaster it down with mortar or stucco. The stone table is supported by a strong wooden frame, with a ledge all round its edges, rising about 2 inches above the glass. Upon the plate to be ground is laid another rough glass, not above half as big, and so loose as to slide upon the former; but cemented to a wooden plank, to guard it from the injury it must otherwise receive from the scraping of the wheel whereto the plank is fastened, and from the weights laid upon it to promote the triture or grinding of the glasses. The whole is covered with a wheel made of hard light wood, about 6 inches in diameter by pulling of which backwards and forwards alternately, and sometimes turning it round, the workmen, who always stand

opposite to each other, produce a constant attrition between the two glasses, and bring them to whatever degree of smoothness they please, by first pouring in water and coarse sand; after that, a finer sort of sand, as the work advances, till at last they pour in the powder of smalt. As the upper or incumbent glass becomes smooth, it must be removed, and another, from time to time, substituted to it.

The engine just described is called a mill by the workmen, and is employed only in grinding the largest-sized glasses. In grinding lesser glasses, they usually work without a wheel, having four wooden handles fastened to the corners of the stone that loads the upper plank, by which they work it about. The grinder's part done, the glass is turned over to the polisher, who, with fine powder of tripoli stone or emery, brings it to a perfect evenness and lustre. The instrument made use of in this branch, is a board furnished with a felt and small roller, which the workman moves by means of a double handle at both ends. The artist in working this roller, is assisted by a wooden hoop or spring, to the end of which it is fixed; for the spring, by constantly bringing the roller back to the same points, facilitates the action of the workman's arm.

SILVERING GLASS.—The various methods invented by Liebig, Bothe, Boettger, and others for depositing silver upon glass have been considerably modified and improved by Krippendorf, in Switzerland, and we give below a condensed statement of the latest improvements introduced by him. The following are the labels required for the materials to be used in silvering glass:

1. Seignette salts; that is tartrate of soda and potash.
2. Solution of seignette salts in the proportion of one gramme to fifty grammes of distilled water.
3. Caustic ammonia, fifty cubic centimeters.
4. Solution of nitrate of silver, 1·8.
5. A flask of 1,000 cubic centimeters capacity for the reducing liquid.
6. A second flask of same size for the silvering solution.

With the help of the above chemicals and flasks, the two normal solutions, viz.: (1) the reducing liquid; (2) the silvering liquid can be prepared in the flasks (5 and 6).

1. The normal reducing solution: 900 cubic centimeters (grammes) distilled water are mixed with ninety cubic centimeters seignette salts solution (2) and the mixture brought to boiling over a suitable fire. During the boiling of the liquid, by which considerable steam is evolved, twenty cubic centimeters of the nitrate of silver solution are added from No. 4, by which the whole liquid is blackened. The whole is allowed to boil for ten minutes until the so called oxytartrate of silver is formed, when the reducing liquid is ready for use. This normal liquid can be preserved any length of time; in fact, it seems to improve by age. It can be kept in flasks, and when required for use must be carefully filtered. Experience has shown that it is better to prepare the normal reducing liquid in a flask rather than in a capsule.

2. The normal silvering liquid: Nitrate of silver is dissolved in water, and ammonia gradually added until the brown precipitate is nearly all dissolved, then filtered, and diluted until there is one gramme of nitrate of silver in 100 cubic centimeters of the liquid. For those who are not

chemists, it is as well to take 900 cubic centimeters distilled water, add eighty cubic centimeters of the silver solution from No. 4 (1·8) and afterwards 100 drops caustic ammonia from No. 3.

3. The silvering process: Equal volumes of the liquids (1) and (2) are carefully and separately filtered and afterwards poured together into a vessel of the proper size, and the well cleaned glass plate introduced. In about ten minutes a decomposition of the mixture begins to take place, indicated by a blackening of the surface, and pure metallic silver will be deposited upon the plate. The introduction of the plate and the cleaning of it take place precisely as in photographic operations, otherwise irregular lines and unequal deposits of silver result. Gentle heat and sunlight facilitate the operation, while cold and darkness retard it. Finally the plate is removed from the vessel, rinsed with pure water, and varnished or otherwise protected by a background. Good photographic varnish can be recommended for coating the film. For bath, after the operation, contains fifty to sixty per cent of the original silver, which can be reclaimed as chloride by the addition of hydrochloric acid. Hollow ware, reagent bottles, and test tubes are silvered by simply pouring in the solutions (1) and (2) in the same way as described above. The silvering the interior of large flasks, it is well to introduce a small quantity of the liquid at first, and to turn it rapidly around until the surface is covered with a thin deposit. Treated in this way, the operation becomes a very simple one, and may lead to the introduction of silver mirrors as substitutes for quicksilver glasses for very many purposes.

SIZING for GOLD on Glass.—Rub up copal varnish either with white hole, umber, or ochre, all of which must be perfectly dry, and then strain through a cloth. The glass must then be cleansed with fine chalk, painted over with the varnish, placed in a warm room, and protected from dust. When it is sufficiently dry, the leaf is to be applied and pressed down with cotton.

SOLUBLE GLASS, To Prepare.—This article of commerce, which has come into extensive use for a great variety of purposes, is very easily prepared when once the process is known.

Potash soluble glass is obtained by mixing 15 parts powdered quartz or pure sand with 10 parts of purified pearlashes, and 1 quart of charcoal, in a Hessian crucible, and exposing the mixture to such a heat as that the mass after six hours shall have become vitrified. Charcoal is employed for assisting, by its decomposition, the production of carbonic acid, as also some sulphuric acid, which may have been produced. It is at present, however, omitted; and if the glass is manufactured on a large scale, the vitrification is done in a reverberatory furnace capable of holding from 1200 to 1500 pounds. The ashes and sand must be well mixed together for some time, the furnace must be very hot before throwing the mixture in, and the heat must be constantly kept up until the entire mass is in a liquid condition. The material is then raked out and thrown upon a stone hearth, and left to cool. The glass mass so obtained is hard and blistered, of blackish-gray color; and if the ashes were not pure, it will also be adulterated with foreign salts. By pulverizing and exposing it to the air, it will absorb acidity, and by degrees the foreign salts will, after frequent agitation and

stirring, be completely separated, particularly after pouring over the mass some cold water, which dissolves them, but not the soluble glass.

The purified mass is now put into an iron caldron, containing five times its quantity of hot water, in small portions, and with constant agitation and replacing occasionally hot water for that which evaporates during the boiling; after five or six hours the whole is dissolved; the liquid is then removed and left to settle over night, in order to be able to separate any undecomposed silix. The next day it is evaporated still further until it has assumed the consistency of a syrup, and standing 28° B., and is composed of 28 per cent. of potash, 62 per cent. of silica, and 12 per cent. of water. It has an alkaline taste, is soluble in all proportions of water, and is precipitated by alcohol; if any salts should effervesce, they may be wiped off. The color is not quite white, but has a greenish or yellowish white tinge.

To make soda soluble glass, to 45 parts of silica or white river sand are added 23 parts of carbonate of soda fully calcined, and 3 parts of charcoal. This is treated in the same manner as the other glass. The proportions of the mixture are altered by different manufacturers; some propose to use 100 parts silix, 60 parts anhydrous Glauber salts, and 15 to 20 parts of charcoal. By the addition of some copper scales to the mixture the sulphur will be separated. Another method is proposed by dissolving the fine silix in caustic soda lye. Kuhlman employs the powdered flint, which is dissolved in an iron caldron under a pressure from 7 to 8 atmospheres.

Liebig has recommended infusorial earth in place of sand, on account of its being readily soluble in caustic lye; and he proposes to use 120 parts of the earth to 75 parts of caustic soda, from which 240 parts of silica-jelly may be obtained. His mode is to calcine the earth so as to become white, and passing it through a sieve. The lye he prepares from 75 ounces of calcined soda, dissolved in five times the quantity of boiling water, and then treated by 50 ounces of dry slacked lime; this lye is concentrated by boiling down to 48° B.; in this boiling lye 120 ounces of the prepared infusorial earth are added by degrees, which are readily dissolved, leaving scarcely any sediment. It has then to undergo several operations for making it suitable for use, such as treating again with lime-water, boiling it and separating any precipitate, which by continued boiling forms into balls, and which can then be removed from the liquid. This clear liquid is then evaporated to the consistency of syrup; it forms a jelly slightly colored, feels dry and not sticky, and is readily soluble in boiling water.

The difference between potash and soda soluble glass is not material; the first may be preferred in whitewashing with plaster of Paris, while the soda glass is more fluidly divisible.

It may be observed that, before applying either soluble glass, it ought to be exposed to the air for ten or twelve days, in order to allow the efflorescence of any excess of alkali which might act injuriously.

Double soluble glass is compound of potash and soda, and is prepared from 100 parts of quartz, 28 parts of purified pearlashes, 22 parts of anhydrous bicarbonate of soda, and 6 parts of charcoal, which are spread in the manner al-

ready described. If the mass is fully evaporated to dryness, it forms a vitreous solid glass, which cannot be scratched by steel, has a conchoidal fracture, is of a sea-green color, is translucent and even transparent, has a specific gravity of 1.43.

Soluble glass for the use of stereo-chromic painting is obtained by fusing 3 parts of pure carbonate of soda and 2 parts of powdered quartz, from which a concentrated solution is prepared, 1 part of which is then added to 4 parts of a concentrated and fully saturated solution of potash-glass solution, by which there is a more condensed amount of silica with the alkalies; this solution has been found to work well for paint. Siemens's patent for the manufacture of soluble glass consists in the production of a *liquid quartz* by digesting the sand or quartz in a steam-boiler tightly closed and at a temperature corresponding to 4-5 atmospheres, with the common caustic alkalies, which are in this way capacitated to dissolve from three to four times the weight of silica to a thin liquid. The apparatus, which was patented in 1845, is well known in this country, as some persons, many years later, obtained a patent for the same purpose in the United States, which, on inspection, does not appear to differ from that of Siemens Brothers.

The latter is the true method of making soluble glass; in fact, the only process by which it ought to be made, and we believe the only way in which at present it is produced by those who pretend to manufacture a serviceable article.

When made in the old way, by simply boiling, at about 212° Fahr., or slightly above that temperature, the water is unable to dissolve a glass containing more than about 60 parts silix, as the remaining 10 parts of potash or 30 of soda are necessary to render it soluble. When, however, a close boiler is used, according to Kuhlman's method, and a pressure of 7 or 8 atmospheres, which corresponds with a temperature of some 120° above the boiling point of water, the solvent qualities of the latter are increased to such an extent as to enable it to dissolve a glass containing half and one third the amount of potash or soda.

Experience has taught that the soluble glass made in the old way, with an excess of alkali, can not stand the influence of the atmosphere when used as a paint. The soda washes out, and leaves the silix in a pulverized condition, so that it soon disappears. In this way the reputation of soluble glass has suffered considerably, before chemistry had taught to produce a better article. Now, however, that by means of heat and pressure we are able to dissolve a glass containing so little soda that the particles appear protected or enveloped by the silica, the atmospheric influences do not affect these, for it is itself a paint, varnish, or rather glazing, and a useful addition to common oil paint. It enters in the chemical paint, already described, and gives it the glossy appearance.

An object painted with soluble glass which was prepared by simple boiling is only slightly affected by cold water, but strongly by boiling water. When prepared under pressure and a heat of some 330° , from a compound containing the least possible amount of alkali, it is unaffected by cold water, and the object painted or covered by the same can only be deprived of its

coating by undergoing the same heat and pressure as was required to prepare the original solution.

These remarks will show the great value of soluble glass, when prepared after the improved method, as compared to the less value, or rather inutility, of that prepared after the old method, at least in cases where it is used for paint or varnish.

The most extensive use which is made at present of soluble glass, produced after the old method, is for the adulteration of soap; in fact, such a preparation is a kind of soap, in which the expensive fatty acids are replaced by the cheap silicic acid or sand; but it is a bad soap, very caustic, as the silicic acid but very imperfectly neutralizes the alkali; consequently all soaps adulterated in this way are very injurious for the skin, and for fine textures.

In several European countries, a penalty of heavy fines is imposed on its manufacture, being considered as an injurious adulteration of an article of prime necessity, of which the purity ought to be protected, and the universal application encouraged as much as possible.

SOLUBLE GLASS for FLOORS.—Instead of the old-fashioned method of using wax for polishing floors, soluble glass is now employed to great advantage. For this purpose the floor is first well cleaned, and then the cracks filled up with a cement of water-glass and powdered chalk or gypsum; afterward a water-glass of sixty to sixty-five degrees, of the thickness of syrup, is applied by means of a stiff brush. Any desired color is to be imparted to the floor in a second coat of the water-glass, and additional coats are to be given until the requisite polish is obtained. A still higher finish may be given by pumicing off the lost layer, and then putting on a coating of oil.

STAINING GLASS.—This beautiful branch of the art is quite too much neglected. The gorgeous display that may be made, and that has been so successfully done by some artists, is sufficient to excite the desire to bring it into more general use. One can conceive of no more beautiful method of ornamenting the windows of churches, and public buildings, or, in fact, anything in the way of ornamenting on glass. The following method is the one now in general use. Before engaging in this, it would be better if the artist could get some little previous instruction. We will endeavor to give the correct principles in regard to the oven, the baking, the colors, and the manner of making and using them.

The Oven is made of fire brick, and arched over like a common bake oven. This is to admit of an iron chest, or muffle, as it is called, so close on the outside that neither fire nor smoke can penetrate, and about three or four inches less than the oven, so that there may be an equal space at the top, bottom, and sides, with legs to keep it from the bottom.

The sheet of glass to be worked upon (the softer the glass the better) should be spread over with gum water, and let dry, in order to prevent the colors from running together, it being also much better than the slippery glass to work on. After it is dry, lay it down evenly upon the design, which has been previously sketched upon paper, and trace, with a fine hair pencil, all the outlines and shades of the picture or ornament with black. (See the mode of the preparation of colors at the end of this article.)

The Lights and Shades are produced by dots, lines, and hatches, very much after the manner of the engraver. When this is finished and dry, it is ready for the

Floating. Take the prepared colors and float them on by dipping the pencil in the color, and taking it, as full as it will hold, to the glass, and just near enough so that the mixture will flow out upon the glass, care being taken that the pencil does not touch the glass, as it leaves a spot. This refers only to transparent colors.

Taking out the Lights.—The methods of doing this, after the color is on, are various. Perhaps the best way is to take a goose-quill, made in the shape of a pen, without the slit. With this the artists take out the lights by dots, lines, etc., to suit his taste. It is then ready for the kiln or oven.

Over the bottom of the oven, or muffle, must be spread, about a half inch thick, a bed of slacked lime, perfectly dry, and sifted through a sieve. Upon this lay a sheet of glass, then another layer of lime, and so on, if desired, for half a dozen sheets, though for very fine work, and where uniformity of coloring is required, it is better to have a less number. There may be quite a number of iron slides in the muffle, so that a number of glasses may be burned at one heat, without having more than one or two upon each slide. Close the muffle and raise the fire; but gradually, or the heat will break the glass.

After it is got up to a red heat, it may remain so for two, three, or four hours, according to the tests, which are strips of glass, painted with the same colors as the sheets, and drawn out occasionally. When the colors are properly burned in, the fire may die away gradually, as it was raised. When cold, the glass is taken out and well cleaned.

The chemicals mentioned in the following preparation of colors, may be had at most of the first-class drug stores. These preparations should be combined, so that each shall require about the same amount of heating to bring out the color.

STAINING GLASS, Colors for.—**Flesh.** Red lead 1 oz.; red enamel 2 oz. Grind to a fine powder; work it up with alcohol, on a flag stone. Requires slight baking.—**Black.** Iron scales 14½ oz.; white crystal glass 2 oz.; antimony 1 oz.; manganese ½ oz. Pound fine and grind in strong vinegar.—**Brilliant Black.** Made to any degree of depth by the mixture of cobalt with the oxides of iron and manganese.—**Brown.** White glass 1 oz.; manganese ¼ oz.—**Rich Brown.** Oxide of platinum.—**Red.** Red chalk 1 oz.; white, hard enamel 2 oz.; peroxide of copper 1 drachm.—**Fine Red.** Rust of iron 3 oz., glass of antimony 2 oz., litharge 2 oz., sulphuret of silver ¼ drachm.—**Green.** Brass dust 2 oz., red lead 2 oz., white sand 2 oz. Calcine the brass to an oxide, and make all into a fine powder. Heat in a crucible one hour, in a hot oven. When cold, grind in a brass mortar.—**Green.** Oxide of chrome.—**Green.** Blue on one side, yellow on the other.—**Yellow.** Fine silver, dissolved in nitric acid. Dilute with plenty of water. Pour in a strong solution of salt, and the silver, in the form of chloride of silver, will fall to the bottom in a yellow powder. When settled, pour off the fluid; fill up with water; when settled, pour off again, and so on for five or six times. When dry, mix the powder with three times its weight in pipe clay, well burned and pounded. Paint on the back of the

glass.—*Yellow.* Sulphuret of silver, glass of antimony, and burnt yellow ochre.—*Blue.* Oxide of cobalt, which is cobalt ore, after being well roasted, is dissolved in diluted nitric acid. Add considerable water, and pour into it a strong solution of carbonate of soda. A carbonate of cobalt is thrown to the bottom in a powder. Wash well, as for chloride of silver, and let dry. Mix this with three times its weight of saltpeter. Burn the mixture in a crucible, by putting a red hot coal to it. Heat, wash, and dry it. Three pints of this to one of a flux made of white sand, borax, saltpeter, and a very little chalk, melted together for an hour, and then ground into an enamel powder for use. Any shape may be had by more or less flux.—*Violet.* Black oxide of manganese, 1 oz.; zaffer, 1 oz.; pounded white glass, 10 oz.; red lead, 1 oz.; mix, fuse, and grind.

The fluxes are made of flint glass, borax, pipe clay, white sand, &c.

The principles of glass staining, and making the colors, therefore, will be found of great service to beginners; yet it must be understood that the practice will be very difficult, without some practical instructions; yet, one who has a taste, and some scientific ability, may be enabled, by studying these rules closely, and by a few trials in experimenting, to succeed in producing the work properly.

WINDOW GLASS, (Cheap).—Take of white sand, 60 lbs.; of unpurified pearlash, 25 lbs.; of common salt, 10 lbs.; of nitre 5 lbs.; of arsenic 2 lbs.; and of manganese, 1½ oz. This will be inferior, but may be improved, when desired, by purifying the pearlash. For other methods of making cheap glass, see receipts already given.

WORKERS IN METALS.

ALLOY (Anti-Friction), For Journal Boxes.—1. Zinc, 17 parts; copper, 1 part; antimony, 1½ parts. This possesses unsurpassable antifric-tion qualities, and does not require the protection of outer casings of a harder metal. 2. The best alloy for journal boxes is composed of copper, 24 lbs.; tin, 24 lbs.; and antimony, 8 lbs. Melt the copper first, then add the tin, and lastly the antimony. It should first be run into ingots, then melted and cast in the form required for the boxes.

ALLOY Incorrosive.—By preparing an alloy of 97 parts lead to 3 parts tin, a metal is produced upon which the action of pure water is very much decreased; and by using an alloy of 95 parts lead to 5 parts tin, we have a metal on which the action of pure water is scarcely perceptible.

ALLOY, for Soldering Iron to Steel, or either of these to Brass.—This alloy consists of 3 parts of tin, 39½ of copper, and 7½ of zinc. When applied in a molten state, it will firmly unite the metals first named.

ALUMINUM, To Extract from Clay.—The first thing is to extract from the clay alum, and then from the alum alumina, and then convert the alumina into a chloride of alumina; and then from this, by the aid of sodium, we obtain aluminum. All these processes require so much patient labor and apparatus, as to account for the cost of extraction and put it beyond the reach of most amateurs. We will give the processes from the beginning. Clay free from carbonate of lime or oxide of iron, is dried without burning, powdered, sifted, and mixed with forty-five per cent. of sulphuric acid (oil of vitriol) of the gravity 1.45. All this in a stone or brick receptacle. Then it is heated in a furnace two or three days, withdrawn, and allowed to rest for a week in a warm place; then it is leached as wood ashes are leached for ley. This is boiled until it is a thick liquid, when a solution of ammonia is added, which causes the thicker parts of the alum water to fall to the bottom; the upper

thin liquor is drawn off, a thin wire of thread put in the middle, around which the alum (sulphate of alumina) in a few days crystallizes, as we see it in the druggists. Now we have what is called ammonia alum. Now take any quantity of this, expose it to a white heat in a crucible to drive off the sulphur and ammonia, and we have a white powdery mass called alumina.

Now supposing your alumina to have come out pure and clear, mix equal parts of alumina, oil, and lampblack, and expose to a very strong heat to thoroughly drive off every trace of water. This heat is kept up until all the oil and lampblack is driven off. Then take what is left, put into a porcelain tub over a furnace; through this tube pass chlorine gas, while the tube is heated red hot. Your gas is obtained by pouring four parts muriatic acid upon one part of black oxide of manganese; the gas rises therefrom and may be conducted by a tube over the alumina. As soon as the tube is choked—that is, when no more gas will enter into combination with the alumina, stop operations and allow the whole to cool. You now have the sesquichloride of alumina in crystals at the cooler end of the tube. This is taken out and preserved in naphtha for use. It attracts the water of the atmosphere very rapidly. Now take your sesquichloride—say six ounces—put it into a wide tub; heat it to drive off moisture and acid; then in the portion of the tube nearest you put some pieces of sodium, which has a strong affinity for chlorine, and increase the heat until no more sodium is visible—or, in other words, you now have resulting the double chloride of sodium and aluminum. It is best to have a connection with a stream of hydrogen gas, in which the last found compound is cooled. Now put the whole into a crucible, cover with common salt, and expose to a powerful heat. At the end of an hour or so the button of aluminum is found at the bottom of the crucible.

This is an outline of the principal processes from the clay to the metal. Manufacturers on

the large scale make many variations, of course; but they generally purchase their alum ready made. There is no certain method of obtaining aluminum from the clay by any shorter process. An Italian chemist, Corbelli, says he has obtained it by mixing six parts pure clay with ten parts of sulphuric or muriatic acid, and then heating the dried and filtered solution in a porcelain crucible to 900° Fahrenheit; then powdering this calcined mass, he mixes it with twenty parts ferrocyanide of potassium and fifteen parts chloride of sodium powdered and thoroughly dried; the whole is then exposed to a white heat in a porcelain crucible, until the contents are fused, when the usual button of aluminum is found at the bottom. We have, however, never heard of any one who has repeated the Italian gentleman's experiment.

AMALGAM for Electrical Machines.—1. Zinc and tin, of each one part, quicksilver two parts. Melt the tin and zinc, add the mercury made hot, pour the mixture into a wooden box, and shake until cold.

2. Zinc, 2 parts, tin, 1 part, quicksilver, 3 parts.

3. Zinc, 2 parts, tin, 1 part, quicksilver, 5 parts.

4. Quicksilver, 6 oz., bees wax, $\frac{1}{2}$ oz., zinc, 2 oz., grain tin, 1 oz.

5. Böttger recommends an amalgam made of two parts by weight of zinc, mixed, while melted, with one part of mercury. He finds it superior to the amalgam commonly used.

AMALGAM of Gold.—Place one part of gold in a small iron saucepan or ladle, perfectly clean, then add 8 parts of mercury, and apply a gentle heat, when the gold will dissolve; agitate the mixture for one minute, and pour it out on a clean plate or stone slab.

For gilding brass, copper, etc. The metal to be gilded is first rubbed over with a solution of nitrate of mercury, and then covered with a very thin film of the amalgam. On heat being applied the mercury volatilizes, leaving the gold behind.

A much less proportion of gold is often employed than the above, where a very thin and cheap gilding is required, as by increasing the quantity of the mercury, the precious metal may be extended over a much larger surface. A similar amalgam prepared with silver is used for silvering.

AMALGAM for Mirrors.—Lead and tin, each 1 oz.; bismuth, 2 oz.; mercury 4 oz.; melt as before, and add the mercury. These are used to silver mirrors, glass globes, etc., by warming the glass, melting the amalgam, and applying it.

ANNEALING STEEL.—1. For a small quantity. Heat the steel to a cherry red in a charcoal fire, then bury in sawdust, in an iron box, covering the sawdust with ashes. Let stay until cold.—2. For a larger quantity, and when it is required to be very "soft." Pack the steel with cast iron (lathe or planer) chips in an iron box, as follows: Having at least $\frac{1}{2}$ or $\frac{3}{4}$ inch in depth of chips in the bottom of box, put in a layer of steel, then more chips to fill spaces between the steel, and also the $\frac{1}{2}$ or $\frac{3}{4}$ inch space between the sides of box and steel, then more steel; and, lastly, at least 1 inch in depth of chips, well rammed down on top of steel. Heat to and keep at a red heat for from two to four hours. Do not disturb the box until cold.

ANVILS, Improved.—The face or table of anvils, as at present made, is often defective, having frequently hard and soft places after hardening, while the face should be equally hard all over its surface; and the steel in some instances not being properly welded to the iron part or butt which forms the lower part, the anvil is thereby rendered unsound and not fit for use. Some improvements recently patented by an inventor of Sheffield, England, have for their object the removal of such defects, and consist in so making anvils that the face may be equally hard all over when finished, and in so casting or welding the butt to the head or upper table that the parts may be thoroughly amalgamated, and the anvil made more durable at a less expense than hitherto.

He first prepares a model of the size and shape of the anvil to be produced. He then places it in a box, covers it with composition, and fills up the box with sand in the ordinary manner. After the model is removed, and the sand perfectly dry, (this being done in the usual way,) he first pours in the molten steel to form the face or table, then, through the same aperture, (after the steel on the table is sufficiently cool,) he pours in a very mild molten steel, which flows over the table and gives the requisite toughness and solidity to the steel back. After a proper time has elapsed, he pours in through another opening the iron or metal, which also runs upon the steel, and forms the lower part or butt of the anvil, and a perfect amalgamation takes place between the iron and steel. The casting being complete, it is then finished in the ordinary manner.

To harden the work, a large metal box or trough, 6 or 8 inches deep, is formed, in which is inserted a number of perforated sharp-edge bars of metal, on which the anvil is allowed to rest on its face or upper surface, either flat or slanting. A sluice communicating with a reservoir of water is then opened, and a force of cold water is allowed to flow upon the face by an upward cast, and to pass under the anvil and over the bars to any depth required. By these means a much harder and more regular surface is obtained than by the present mode of manufacture. After this, the surface is ground in the ordinary way.

ANTIMONOID.—A welding power, named antimonoid, has been in use for some time past in Germany, and found to be of great efficiency. The formula for its preparation has, until lately, been kept a secret; but we now learn that it consists of four parts of iron turnings, three parts of borax, two parts of borate of iron, and one of water.

ASHBERRIUM.—This name has been applied to a new alloy which consists of 80 parts of tin, 14 of antimony, 2 of copper, 2 of nickel, 1 of aluminium, and 1 of zinc.

BATTERY, Cheap Electrical.—First procure a common wine bottle of a good length and thickish glass. Drill a hole through its bottom, which is generally done by placing a piece of worsted, which must be dipped in turpentine, upon the bottom, and igniting it. Through this hole and the mouth pass a spindle. Fasten it well in the bottle; put a crank upon one end. Then put the bottle on a frame similar to a grindstone. Next make a cushion of wash-leather, stuffed with wool, and fastened to the top of a small frame. This frame is to be of such a

high that the cushion shall press against the sides of the bottle, and a piece of black silk is fastened to the top of the cushion, and hangs over the bottle. The cushion should be smeared with an amalgam formed by melting together in the bowl of a tobacco pipe, one part of tin with two of zinc; to which, while fluid, should be added six parts of mercury. These should be stirred about till quite cold, and then reduced to a fine powder in a mortar, and mixed with a sufficient quantity of lard to form a stickish paste. When this is done the machine is complete. But before using we must have a conductor. This is made in the following manner: At right angles to one end of a cylinder of wood, about two and one-half inches in diameter, and six inches long, fix a small wooden cylinder about three-quarters of an inch in diameter, and three inches long, rounded at both ends; the other end of the large cylinder is also to be rounded. Cover the whole with tinfoil, and mount it on a stand on a glass rod. When used, it is to be placed with the even piece in a line even with, and about half an inch from the bottle; and it should be of such a height as to come just below the silk apron. When it is wished to charge a Leyden jar, it is to be placed at the round end of the conductor. By these simple means a great variety of pleasing experiments may be performed.

BATTERY, Cheap Galvanic. — 1. Procure about twenty copper pennies, (if worn smooth so much the better) or get some sheet copper, cut circular and of a large diameter, and the same number similar pieces of zinc. The latter may be formed by the constructor himself; being very easily melted, it may be cast in a mold like lead, or it may be procured in a sheet, and cut similar to the copper. Then provide the same number of pieces of cloth, which must be soaked in a solution of common salt and water; or what is better, a liquid composed of one quart of sulphuric acid, two of nitric acid and sixty of water. After this is done, place one of the pieces of zinc in a tea saucer, and on it put one of the pennies, or pieces of sheet-copper; on this place a piece of cloth, and so continue making a pile—zinc, copper, cloth—until they are all piled on one another; taking care to make the same arrangement throughout. The piece on the top, which will be a penny, should have a copper wire, which, for some experiments, should be tipped with platinum wire soldered to it, and the lower piece, which will be zinc, should be treated in the same manner. From the ends of these wires a stream of the galvanic fluid will constantly issue, until all the acid is absorbed from the pieces of cloth, and although the apparatus is on a very small scale, a variety of exceedingly interesting experiments may be performed with it.—2. Take a cylindrical vessel, and put another of porous porcelain inside of it; fill the vessel with diluted sulphuric acid, and the space between the two with sulphate of copper (if you require to plate the article with copper); if not a solution of the salt of gold, silver, etc., according to that which you wish it to be; put a slip of zinc in the sulphuric acid, and attach a copper wire to it, and the other end to the medal or article you wish to plate, and immerse that in the other solution. Your battery is now complete. If you want the copper to be very thick, you must put a few solid crystals of copper in the solution; where you do not want it to come in contact, you must

touch it with a little grease; if you want to take the copper off the article you must do it over with a slight varnish.—3. *A Cheap Galvanic Battery* has been described by Dr. Golding Bird, which, it is stated can decompose water and ignite charcoal. The mode of construction is to break the stem of six tobacco pipes close to the bowls, and close the apertures at the bottom of each bowl with sealing wax; get six small toy tumblers, about half an inch in height: put in each a cylinder of amalgamated zinc, and place in each pipe bowl a thin slip of platinum foil, half an inch wide, and connect it with the zinc of the next cell with platinum wire; fill the pipe bowls with the nitric acid and the tumblers with dilute sulphuric acid, and the battery is complete. In case the platinum cannot be obtained, copper may be substituted. This battery is in imitation of the famous battery made by Faraday out of a common thimble.

BATTERY (Mercurial) of Davy.—This galvanic battery, which has lately been extensively and almost exclusively used in France, is not so universally known as it deserves. It is composed of zinc and carbon; but in place of diluted acid, the zinc is simply immersed in pure water, while the carbon is immersed in a paste of moistened sulphate of the oxide of mercury. The chemical action is similar to the Daniel battery, consisting of zinc, copper, and sulphate of copper. The zinc is oxidized at the expense of the water, which is decomposed, its oxygen combining with the zinc, forming oxide of zinc, while the hydrogen in its nascent state reduces the oxide of mercury, combining with the oxygen, forming water, and leaving the mercury in a metallic state. In this condition mercury can not remain in combination with sulphuric acid. Hence, the latter is also set free and combines with the oxide of zinc, forming sulphate of zinc; exactly as is the case in the Lowe, Daniel, and other batteries, while the metallic mercury collects at the bottom of the vessel. Such a battery may remain in operation for half a year, without cleaning or the addition of liquid. The current generated by 40 small elements has the same power as that from 60 of Daniel's larger ones, which lasted less than half the time.

As a modification of this battery, instead of the soluble sulphate of mercury, the insoluble subsulphate of the same metal may be used. When mercury is boiled with sulphuric acid, a portion of the acid is decomposed in order to furnish oxygen for the oxidation of the mercury, which then combines with the remaining acid and forms a dry, neutral salt. When this is diluted with water, it is resolved, like many other salts, into two compounds; an acid sulphate, which is dissolved, and a basic sulphate, which is insoluble. The latter has a lemon-yellow color, and being supposed to resemble closely in its medical effects the powdered root of a now obsolete plant, the turpeth, it was called the mineral turpeth.

For many years this substance had no practical value in the arts, but now it will probably be extensively employed in galvanic batteries for telegraphic and other purposes.

BATTERY, To plate with.—If the plate is to be gold use the gold solution for electro-plating; if silver, use the silver solution. Prepare the article to be plated by immersing it for several minutes in a strong ley made of potash and rain water, polishing off thoroughly at the end of the

time with a soft brush and prepared chalk. Care should be taken not to let the fingers laid down in the directions for plating with a battery. If the article being plated has the strip of zinc touching much of its surface, it may be well to change the place of contact at every polishing.

You will find this mode of plating but little inferior to that of plating with a battery. It is more employed now, perhaps, than any other.

BATTERY (Galvanic) Improved Liquid for.—Mr. Victor Barjon's new battery liquid, is made by mixing a solution of bichromate of potash with a little lime, and with sulphuric acid. He puts 2 lbs. of bichromate of potash into a gallon of boiling water, and lets the solution cool down to 68°, and adds 2 oz. of lime. After stirring, he adds sulphuric acid until the gravity reaches 35° Beaumé. Then, having stirred the whole, he lets it stand for 24 hours, when it is ready for use.

BELL METAL.—1. Melt together under powdered charcoal, 100 parts of pure copper, with 20 parts of tin, and unite the two metals by frequently stirring the mass. Product very fine. —2. Copper 3 parts; tin 1 part; as above. Some of the finest church bells in the world have this composition. —3. Copper 2 parts; tin 1 part; as above. —4. Copper 72 parts; tin 26½ parts; iron 1½ parts. The bells of small clocks or pendules are made of this alloy in Paris.

It is absolutely necessary in this process to keep the metals from contact with the air, for which purpose, the powdered charcoal is employed. The union of the two metals in this alloy is so complete, that its gravity is considerably greater than that of the mean of its constituents, thus evincing chemical union to have taken place.

The proportions of the first form are those of the Indian gong, so much celebrated for the richness of its tone. In very small bells, and in those of repeating watches, a little zinc is generally added, which makes them give out their tones the sharper. A less proportion of tin is now generally used for church bells, than for house or clock bells, the tones being thought to be rendered thereby more suitable to their respective purposes. The substitution of zinc for the iron in the last formula, would (I am told) improve the tone.

To give this alloy its highest degree of sonorousness, it must be subjected to sudden refrigeration. M. D'Arcet recommends the pieces to be ignited after they are cast, and then to be suddenly plunged into cold water. They are next to undergo a well-regulated pressure by skillful hammering, until they have assumed their intended form; then to be heated, and allowed to cool slowly in the air. In a general way, however, bells are formed by simple casting. The addition of lead, and other metals, to this alloy, greatly lessens its sonorousness. For common purpose the third form is generally used.

BOILER EXPLOSIONS, To Prevent.—Frequent inspection and careful management of boilers are the best preventives of explosions, and the insurance of losses by damage from such explosions, by companies established especially for such purposes, secures the desirable inspection; while if the rules adopted by these companies are faithfully observed, good management as well as safety is obtained. The following

rules are so plain and practical that they are calculated to meet almost every conceivable exigency:

Low Water.—In case of low water, immediately bank or cover the fires with ashes, or if no ashes are at hand, use fresh coal. Do not turn on the feed under any circumstances, nor tamper with or open the safety-valve. Let the steam outlets remain as they are.

In Cases of Foaming.—Close throttle, and keep closed long enough to show true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In cases of violent foaming, caused by dirty water, or change from salt to fresh, or vice versa, in addition to the action before stated, check draught and cover fires with fresh coal.

Safety-Valves.—Raise the safety-valves cautiously and frequently, as they are liable to become fast in their seats, and useless for the purpose intended.

Safety-Valve and Pressure-Gauge.—Should the gauge at any time indicate the limit of pressure allowed by this company, see that the safety-valves are blowing off. In case of difference, notify the company's inspector.

Gauge-Cocks — Glass-Gauge.—Keep gauge-cocks clear, and in constant use. Do not open them too suddenly. Glass gauges should not be relied on altogether.

Leaks.—When leaks are discovered, they should be repaired as soon as possible.

Blisters.—When a blister appears, there must be no delay in having it carefully examined, and trimmed or patched, as the case may require.

Clean Sheets.—Particular care should be taken to keep sheets and parts of boilers exposed to the fire perfectly clean; also all tubes; flues and connections well swept. This is particularly necessary where wood or soft coal is used for fuel.

Blowing-Off.—Blow down at least once in two weeks—every Saturday night would be better. In case the feed becomes muddy, blow out six or eight inches every day. Where surface blow-cocks are used, they should be often opened for a few moments at a time.

Filling up the Boiler.—After blowing down, allow the boiler to become cool before filling again. Cold water pumped into hot boilers is very injurious from sudden contraction.

Exterior of Boiler.—Care should be taken that no water comes in contact with the exterior of the boiler, either from leaky joints or other causes.

Removing Deposit and Sediment.—In tubular boilers, the hand-holes should be often opened, and all collections removed from over the fire. Also, when boilers are fed in front and blown off through the same pipe, the collections of mud or sediment in the rear end should be often removed.

General Care of Boilers and Connections.—Under all circumstances keep the gauges, cocks, etc., clean and in good order; and things generally, in and about the engine and boiler-room, in neat condition.

BOILER INCRUSTATIONS, To Prevent.—A very simple mode of preventing boiler incrustation is in general use at the Darmstadt gas-works. The engine has worked day and night since 1854 almost without interruption, and the formation of calcareous deposits has been

entirely prevented by the use of crude pralineous acid, combined with tar; it is either introduced into the boiler or mixed with the feed water. Since the mixture has been in use they have never had a stoppage through incrustation, and have never had to use a hammer to remove scale. Each year, during the summer, when less gas is required, the boiler is opened, and perhaps a couple of handfuls of loose sediment taken from the bottom. The quantity employed is very small—just enough to redden litmus paper; consequently the iron is not attacked, as indeed is apparent from the fact that the boiler has been but twice under repair.

BOILERS, To Prevent Lime Deposits.—Put into your cistern or tank, from which the boiler is fed, a sufficient amount of oak tan bark, in the piece, to color the water rather dark; run four weeks and renew. This plan has been much used, in the lime-stone sections of Ohio, giving general satisfaction.

BORAX, To Prepare for the Blow-pipe.—Take one ounce of borax, coarsely powdered, put it into a clean crucible, and cover it loosely. Put the whole into a furnace, and watch it till it ceases to swell, then augment the heat, and when the whole fuses quietly, take it out, and pour it into a wedgewood-ware or metallic mortar, and when cold, reduce it to an impalpable powder, in which state it is to be used.

BORAX, Substitute for.—Coppers, 2 oz.; saltpetre, 1 oz.; common salt, 6 oz.; black oxide of manganese, 1 oz.; prussiate of potash, 1 oz.; all pulverized, and mixed with 3 lbs. of nice welding sand, and use the same as you would sand. High-tempered steel can be welded with this at a lower heat than is required for borax.

BRASS.—An alloy of copper and zinc. Brass was formerly manufactured by cementing granulated copper, or copper clippings, with calcined calamine and charcoal, in crucibles, exposed to a bright heat. The alloy was found in lumps at the bottom of the crucible on cooling. These were remelted and cast into ingots. At the present day, brass is generally made by direct union of the metals. This process requires much care, owing to the different degrees of fusibility of copper and zinc. The proper quantity of zinc is first melted, and slips of copper plunged into it, which are rapidly dissolved, as it were, and the addition is continued until an alloy is formed, somewhat difficult of fusion, when the remainder of the copper is added. The brass thus formed is broken into pieces, and remelted under charcoal, and a proper addition of either zinc or copper made, to bring it up to the color and quality desired. It is next cast into plates, or other forms, in moulds of granite. When submitted to the rolling-press for reduction to thin plates, it requires to undergo the operation of annealing several times.

1. (*Fine Brass.*)—2 parts of copper to 1 part of zinc. This is nearly one equivalent each of copper and zinc, if the equivalent of the former metal be taken at 63.2; or 2 equivalents of copper to 1 equivalent of zinc, if it be taken with Liebig and Berzelius, at 31.6.

2. Copper 4 parts, zinc 1 part. An excellent and very useful brass.

BRASS, Dipping.—The operation of "dipping" is practised as follows: The shop is or should be, a well ventilated, high-roofed apartment, with abundant provision

for the escape of the fumes of the acid. It is built round interiorly with brick-work, on which to place the tubs which contain the water to kill the acid, and the "jowls" or earthenware vessels in which the various strengths of acid are contained. There should also be a muffle in which to anneal the work, and a horizontal plate of iron with provision to heat it, in order to keep the boxwood receptacle or sheet-iron pan and its contents at a moderate temperature. This shop should be in connection with a space or yard in which to place the pickle troughs, and there should be ample provision for the supply of clean cold water; it soft water so much the better; also a set boiler in which to keep hot a supply of lye or alkaline solution, as potash or soda. The materials employed are aquafortis of various strengths, pure water, and argol, i. e., the refuse or sediment of wine casks, or crude tartar in the form of a powder. After annealing, the work is immersed in a weak solution of pickle, to scale it, or remove the external skin. After rinsing it out, it is brushed with sand, to remove the more firmly adherent scales. Again pickled, if uniformly clean, it is then in a condition to receive a final finish, if bright dipped; and, if dead dipped, to be subjected to the "deadening" process, which is conducted as follows: The aquafortis is reduced from its dipping strength by means of water, or a special variety is used and designated by the name of "deadening aqua." A quantity of either the former or latter is poured into a "jowl" or brown earthenware opened-mouthed vessel. The articles are placed therein, and the jowl agitated till a creamy coating is observable over their entire surface; they are then removed and washed out in water. After they are cooled and the acid "killed," they are passed through the strong aquafortis, rinsed out in three several tubs of water, and then dried out in warm box-sawdust contained in the sheet-iron pan already alluded to. Any acid which may have accidentally insinuated itself into defects in the work is neutralized by immersion in the lye or alkaline solution contained in the boiler. After the articles are dried out they are then plunged into a tub containing pure water, on the surface of which is strewed a small quantity of argol, or tartar. In this condition the workman holds them in his vice, or, if round or globular places them on the chuck in his lathe.

The operation of dipping is considerably dependent on temperature. It is retarded by cold, and accelerated by a moderate heat; in exceedingly hot weather it is with great difficulty accomplished, and is rarely satisfactory, as the work becomes speckled or irregular in the "deadening." The success of the operation of dipping is greatly dependent on the mixture of the metal, and not a little on the aquafortis, its strength and purity. Up to the present time practice has been the only guide to English "dippers;" the recurrence of a certain phenomena they obviate by experience, by rule of thumb or experiment; and these experiments are not on all occasions successful in removing the difficulties which present themselves. Science, to be useful, should deal with the rationale of the operations and processes employed in manufactures; but no scientific work has yet explained the "why and because" which regulates the failure or success of "dead dipping."

To dipping follows burnishing, the process of which is as follows:

BRASS, BURNISHING.—Burnishing, which furnishes a contrast to other portions of dead dipped work, is effected by means of steel burnisher, or tools of steel, varying in form according to the nature of the work and surfaces of the portion to be burnished. For ordinary flat work, or tubes and the edges of cast work, the burnishers are from twelve to fifteen inches long and oval shape, and tapering to a point. Other varieties of burnishers, as for lathe burnishing, are made with variously formed terminations; others are hooked, and of various breadths and thicknesses; all are blunt, and after being hardened are polished up to the highest degree of brilliancy on the portion used for burnishing. The article to be burnished is held in a vice, if cast; if stamped, it is laid on a "force" or solid metal convex brass or lead cast of the stamped article; this furnishes an internal support to the thin metal, and prevents its sinking under the pressure of the burnisher. The surface to be burnished is operated upon with the steel burnisher, dipped in "ox gall." This lubricates the burnisher, and prevents scratching. The work, when it gets dry, is dipped into the argol water. When the article has been burnished on all the portions intended, it is passed through "sharp water," i. e., water in which a small quantity of acid has been mixed, thereafter it is rinsed out in pure water, and finally dried out in warm box-sawdust; it is then lacquered to protect it from oxidation or tarnish.

BRASS, To Bronze.—For bronzing the brass objects are first made warm, and washed in a hot solution of ammonium chloride, (sal ammoniac,) and then placed over night in a tolerably diluted solution of two parts cupric acetate, (verdigris,) and one part ammonium chloride in six parts of vinegar. The next morning they are taken out and washed. A bronze to be applied with the brush is made by boiling 16 parts ammonium carbonate and 16 parts cupric sulphate in 200 parts vinegar till the latter is almost entirely evaporated; then adding one part of oxalic acid, and 4 parts of ammonium chloride dissolved in 200 parts vinegar; the whole is placed over the fire till it boils, then cooled, filtered, and preserved in well-stoppered bottles. Clean thoroughly the object to be bronzed, heat it, and apply the liquid with a fine brush. After giving it time to act, pour on boiling water, and rub with a dry oily cotton rag, and then with dry cotton, till every trace of the vinegar has disappeared.

BRASS, A new.—The difficulty of uniting iron to brass is created by the unequal rate of expansion in the two metals, which destroys the unity when the temperature is changed. A new alloy of copper is announced, and the inventor claims that its expansion by heat is so similar to iron and steel, that the surfaces may be regarded, when joined, as permanently united, for all practical purposes. The formula is as follows: Tin, 3 parts; copper, 39½ parts; zinc 7½ parts.

BRASS, Coating.—1. Brass plates and rods may be covered with a superficial coating of brass, by exposing them in a heated state to the fumes of melted zinc, at a high temperature. Use. For rolling into thin plates, or drawing into wire. The celebrated spurious gold wire of Lyons is thus made.—2. Vessels of copper may be coated with brass, internally, by filling them with water

strongly acidulated with muriatic acid, adding some amalgam of zinc and cream of tartar, and then boiling for a short time.

BRASS, To Coat with Tin.—It is often desirable to coat brass, copper or lead with a thin covering of tin. This can be managed thus: Half a pint of table salt and a quarter pound of cream of tartar are dissolved in about five gallons of water. Some tin scrapings or filings are then added to the water. The articles to be coated are then put into the solution and smartly boiled, being stirred all the time, until the requisite coating is given. Boiling in a tin vessel without the filings will give a very fair coating, but of course not so good.

BRASS, To Cover with beautiful Luster Colors.—One ounce of cream of tartar is dissolved in one quart of hot water, to which is added half an ounce of tin salt (protochloride of tin) dissolved in four ounces of cold water. The whole is then heated to boiling, the clear solution decanted from a trifling precipitate, and poured under continual stirring into a solution of three ounces hyposulphite of soda in one-half a pint of water, whereupon it is again heated to boiling, and filtered from the separated sulphur. This solution produces on brass the various luster-colors, depending on the length of time during which the articles are allowed to remain in it. The colors at first will be light to dark gold yellow, passing through all the tints of red to an iridescent brown. A similar series of colors is produced by sulphide of copper and lead, which, however, are not remarkable for their stability; whether this defect will be obviated by the use of the tin solution, experience and time alone can show.

BRASS, CLEANING of.—Rub the surface of the metal with rotten stone and sweet oil, then rub off with a piece of cotton flannel and polish with soft leather. A solution of oxalic acid rubbed over tarnished brass soon removes the tarnish, rendering the metal bright. The acid must be washed off with water, and the brass rubbed with whitening and soft leather. A mixture of muriatic acid and alum dissolved in water, imparts a golden color to brass articles that are steeped in it for a few seconds.

BRASS, Cleansing Solution for.—Put together two ounces sulphuric acid, an ounce and a half nitric acid, one dram saltpetre and two ounces rain water. Let stand for a few hours, and apply by passing the article in and out quickly, and then washing off thoroughly with clean rain water. Old discolored brass chains treated in this way will look equally as well as when new. The usual method of drying is in sawdust.

BRASS, To Deposit on Zinc and other Metals.—It is easy enough to electro-plate brass objects with copper, silver, or gold, by means of the galvanic battery; but the deposition of brass on other metals is not so easy. Brass being an alloy of copper and zinc, there is a tendency to deposit the copper in preference, if we use a solution of sulphate of copper and sulphate of zinc, mixed, for our deposition bath. Experience has proved that weak currents, produced by weak batteries, have especially a tendency to deposit only one metal out of the mixture, of diverse metallic salts, and it requires a strong current to deposit them together, so as to obtain an alloy. But strong currents possess the grave objection of deposition thick, irregular, brittle films, which do not adhere

well and easily peel off. Hence it is desirable to use a preparation of the metallic salts, which will permit their simultaneous precipitation at the same time with a weak current.

Such a preparation was given recently by Walenn, in England. It had already been found that by using in the bath the cyanides of copper and zinc, (cyanides, by the way, are always used in depositing gold and silver,) the alloy may be much more easily deposited than from the sulphides. The manufacturers of gas fixtures make their castings of chandeliers and brackets mostly of zinc, and then electro-plate them with brass. This method is followed at present, also, in making statuary. It is prepared in quantity for the trade on a large manufacturing scale. The practice in such establishments, thus far, is to dissolve cyanide of copper and zinc in a solution of cyanide of potassium and a salt of ammonium, so as to obtain a more soluble double or triple salt of the metal, with potassium and ammonium.

This preparation, notwithstanding it allows the deposition of the alloy to take place regularly, has the defect of evolving hydrogen gas in great quantity, which interferes with the galvanic current; and this defect has been removed by the prescription of Walenn, which runs as follows: To a mixed solution of cyanide of potassium and neutral tartrate of ammonia in water, add the cyanides of copper and zinc till saturated, then add the oxides of the same metals; that is, black oxide of copper and unadulterated zinc-white, and let the liquid dissolve as much of them as possible. This preparation being used as a bath, causes the evolution of hydrogen to be made much less. It may even be entirely prevented by the addition of ammonide of copper, when a very weak galvanic current will suffice. If the color of the brass is too pale, a little more copper salt is to be added to the solution; if too deeply copper-colored, a little more of the zinc salt. A large brass plate is used for the positive electrode, the object to be coated being attached to the negative one. If every thing works right, the brass plate will lose as much in weight as the object gains by the deposit. As a general hint for all electro-plating, we must observe that the objects to be coated must be well cleaned, scrubbed with fine sand, washed, then scrubbed again, and then connected with the zinc pole of the battery before being placed in the trough; and that the best way of treatment after the deposit is formed, is to wash in clear water and dry in the sawdust of a non-resinous wood. If the solution is worked at an elevated temperature, the contact of the coating will be promoted. Finally, we may observe that acid solutions give "mat" deposits, while alkaline solutions give the reverse, a bright or bristling coating.

BRASS INLAID WORK, To Polish.—File the brass very clean with a smooth file; then take some tripoli powdered very fine, and mix it with the linsed oil. Dip in this a rubber of hat, with which polish the work until the desired effect is obtained.

If the work is ebony, or black rose-wood, take some elder-coal powdered very fine, and apply it dry after you have done with the tripoli, and it will produce a superior polish.

The French mode of ornamenting with brass differs widely from ours, theirs being chiefly water-gilt (or moulu), excepting the flutes of

columns, etc., which are polished very high with rotten stone, and finished with elder-coal.

BRASS, To Lacquer.—Lacquering, or the covering of finished brass work with transparent varnish to preserve the surface and finish of the articles from ordinary and extraordinary atmospheric and other influences, may be said to complete the manipulatory operations in the manufacture of objects in brass. The lacquering room, in the best regulated manufactories, is a lofty, well-aired apartment, with counters round, on which to lay the finished articles. In it are erected, on brick basements, with cast-iron top or plate placed horizontally like an ordinary hot-hearth, one or more stoves. Ordinary cast-iron frames and doors are inserted in front to allow of the introduction of the fuel. A series of flues running under the surface of the iron plate secures the diffusion of the heat generally on its upper surface. On this plate are laid the articles to be lacquered. The lacquer or varnish is composed of spirits of wine in which has been dissolved seed lac. In appearance it presents that of pale French brandy, verging, where colored, into that of the brown variety of the spirit already named. Turmeric, dragon's blood, or sandal wood, will impart various shades of color if dissolved in the mixture of spirits of wine and lac already named. The brass articles having been coated over when cold with the lacquer, are laid on the hot iron plate, and when sufficiently heated are again coated with lacquer applied with large round camel hair brushes, of sizes varying from five-eighth inch to one inch diameter. Delicate and skillful application, and the perfection of lacquering consist in a uniform coating. Careless lacquering is indicated by smearing or irregular depths of shade, and consequently impaired brilliancy of effect. Too much heat frizzles the lacquer; if too cold the articles will be dull. The spirit of wine is simply a solvent for the gum, and when the lacquer is applied evaporates or flies off, leaving the gum on the surface of the brass, and protects its surface completely for years from ordinary exhalations or other influences. Sea air, the noxious fumes of chemicals or tobacco, the deposits of flies, damp, etc., however, act upon it, and corrode through the lacquer, impairing its brilliancy and protective properties. The idea that lacquering brightens up brass work, apart from finish, is an error too frequently entertained; unless there is previous finish, lacquer being transparent serves only to render more apparent the existing defects on the surface of the object on which it is applied.

Attempts have been made to introduce steam-heated lacquering plates, or a hollow iron box into which the steam passes. Heat in steam, however, indicates pressure, and no ordinary engine boiler valve could be so loaded as to stand the pressure to get up the required degree of heat equal to that produced by fuel introduced immediately under a cast-iron plate.

Steam has, however, been successfully applied to the lacquering of tubes and other hollow articles as follows: A steam pipe is conducted from the boiler of the engine connected with the works; this pipe is led into the lacquering room, and placed horizontally about three feet or three feet six inches from the floor. In this horizontal tube is inserted, at regular distances, a number of good well-made gun-metal taps; these are fitted with lever keys, easily removed after the steam has

been turned on or off. The taps have tapering ends, which are inserted into the ends of the pipe or tube to be lacquered. The opposite end of the tube is supported on a stand, the steam is turned on, passes through the interior of the tube, and speedily heats it to a sufficient temperature for lacquering. The lacquer is then applied as already described. For the purpose of lacquering such articles as have been named, the steam method alluded to has no equal. The heat of the tube, or hollow article to be operated upon, can be increased or diminished at will by simply turning on more, or checking the admission of the steam. Contrast this with the tedious process of heating a twelve or eighteen feet tube, or hollow cornice pole, on a cast-iron plate. The utmost length which could be properly heated at one time would not extend beyond eighteen inches or two feet. We have thus at least twelve separate heatings; removed from the hot plate the article speedily cools, and we have nine or twelve separate joinings of lacquer; the lacquerer must be careful and skillful indeed who is able to conceal the junctions of the several points of contact. If this is contrasted with the tube regularly heated by steam, the superiority of the steam process will at once be recognized.

BRASS ORNAMENTS, To Clean.—Brass ornaments, that have not been gilt or lacquered, may be clean, and a very brilliant color given to them, by washing them with alum boiled in strong lye, in the proportion of an ounce to a pint, and afterwards rubbing them with strong tripoli.

BRASS ORNAMENTS, To Preserve.—This may be done by two simple processes. The first is to beat sal ammoniac into a fine powder, then to moisten it with soft water, rubbing it on the ornaments; which must be heated over charcoal and rubbed dry with bran and whiting. The second is to wash the brass work with roche alum boiled in strong lye, in the proportion of an ounce to a pint. When dry it must be rubbed with fine tripoli. Either of these processes will give to brass the brilliancy of gold.

BRASS, To Temper, or Draw its Temper.—Brass is rendered hard by hammering or rolling, therefore when you make a thing of brass, necessary to be in temper, you must prepare the material before shaping the article. Temper may be drawn from brass by heating it to a cherry red, and then simply plunging it into water the same as though you were going to temper steel.

BRASS, For Wire.—Copper, 34 parts; calamine, 56 parts. Mix.

BLUING Small Steel Articles.—1. Having a quantity of charcoal ashes on an iron plate, or in a box, place over the fire, and heat slowly. Put the articles to be blued in the ashes, and as they get heated, take out occasionally to see how the color is drawing. When the color is a blue, do not take them out, but leave them until they have become white again, when they should be taken out and allowed to cool. Now, by returning the articles and reheating you will have the "second blue." The first blue will rub off easily, the second blue will wear quite a long time, but in order to get a good color, the article should be highly polished, and free from grease of any kind, and in no case should the articles be dipped in oil or water, before or after bluing,

unless you wish to spoil the color.—2. Give the pieces a bright fine polish, and lay them in a sheet-iron pan, with some slaked lime. Set the pan over a forge, or in any place where he can regulate the heat, and watch them carefully until they have the right color. If the steel be good, they will take on a bright vivid blue.

BLUE (Transparent), For Steel Ploughs.—Take dammar varnish $\frac{1}{2}$ gal.; finely ground Prussian-blue $\frac{1}{4}$ oz.; mix thoroughly. For ground steel ploughs, or other ground steel, one or two coats of this will be found sufficient to give a nice blue appearance, like highly tempered steel; some may wish a little more blue; if so, add the Prussian-blue to your liking.

BRITANNIA METAL.—1. Tin, 82 parts; lead, 18 parts; brass, 5 parts; antimony, 5 parts. Mix.

2. Brass, 1 part; antimony, 4 parts; tin, 20 parts. Mix.

3. Plate brass, tin, bismuth, and antimony, of each equal parts. Add this mixture to melted tin until it acquires the proper color and hardness.

BRONZE, Aluminum.—Resembles gold in appearance; is said to be twice as strong as the best gun-metal; as light as wrought-iron; is not easily tarnished. It is easily stamped and engraved. It is composed of 10 parts of aluminum and 90 of copper. It requires to be remelted, as the first melting is brittle.

BRONZE, Gold.—Pure gold bronze powder may be made as follows: Grind leaf gold with pure honey until the leaves are broken up and minutely divided. Remove this mixture from the stone by a spatula and stir up in a basin of water; the water will melt the honey and set the gold free. Leave the basin undisturbed until the gold subsides. Pour off the water and add fresh instead, until the honey is entirely washed away, after which collect the gold on filtering pans and dry for use. A cheaper sort may be made thus: Melt one pound of tin in a crucible and pour it on one-half pound of pure mercury; when this is solid grind it into powder with seven ounces of flowers of sulphur, and one-half pound of sal ammoniac.

BRONZING Gun-barrels.—The so-called butter of zinc used for bronzing gun-barrels is made by dissolving zinc in hydrochloric acid till no more free acid is left; which is secured by placing zinc in the acid until it ceases to be dissolved. The liquid is then evaporated until a drop taken out and placed on a piece of glass solidifies in cooling, when it is mixed with 2 parts of olive-oil for every three parts of the liquid. The barrels must be cleansed and warmed before applying the so-called butter, which put on with a piece of linen rag.

BRONZE, For Cutting Instruments.—Copper, 100 parts; tin, 14 parts. M. Dussausy says that the above alloy, when hardened and tempered after the manner of the ancients, will yield an edge nearly equal to that of steel. Several analyses have been made of ancient cutting instruments, whence it appears that the proportion of tin varies from 4 to 15 per cent., which tends to prove that more depends on the exact mode of tempering the alloy, than on the relative quantities of the ingredients. Zinc and tin are inadmissible in bronze for this purpose. One or two per cent. of iron might nevertheless be added with advantage. The ancient bronze used

for springs, contained only 3 to 4 per cent. of tin.

BRONZING FLUID.—For brown: Iron filings, or scales, 1 lb.; arsenic, 1 oz.; hydrochloric acid, 1 lb.; metallic zinc, 1 oz. The article to be bronzed is to be dipped in this solution till the desired effect be produced.

BRONZE, Green.—Acetic acid, diluted, 4 lbs.; green verditer, 2 oz.; muriate of ammonia, 1 oz.; common salt, 2 oz.; alum, $\frac{1}{2}$ oz.; French berries, $\frac{1}{2}$ lb.; boil them together till the berries have yielded their color, and strain. Olive bronze, for brass or copper.—Nitric acid, 1 oz.; hydrochloric acid, 2 oz.; add titanium or palladium, as much as will dissolve, and add three pints of distilled water.

BRONZING for Iron or Wood.—First, make a black paint; then put in a little chrome-yellow, only sufficient to give it a dark-green shade; apply a coat of this to the article to be bronzed; when dry, give it a coat of varnish; and when the varnish is a little dry, dust on bronze by dipping a piece of velvet into the bronze and shaking it upon the varnish; then give it another coat of varnish, and when dry, all is complete.

BRONZING of Medals and Ornaments of Copper, Electrotypes, etc.—1. Having thoroughly cleaned and polished the surface of the specimen, with a brush apply the common crocus powder, previously made into a paste with water. When dry, place it in an iron ladle, or on a common fire-shovel, over a clear fire about 1 minute; and when sufficiently cool, polish with a plate brush. By this process a bronze similar to that on tea-urns is produced; the shade depending upon the duration of the exposure to the fire.

2. By substituting finely-powdered plumbago for crocus powder in the above process, a beautiful, deep, and permanent bronze appearance is produced.

3. Rub the medal with a solution of livers of sulphur, or sulphuret of potassium, then dry. This produces the appearance of antique bronze very exactly.

4. Dissolve 2 oz. of verdigris and 1 oz. of sal ammoniac in 1 pint of vinegar, and dilute the mixture with water until it tastes but slightly metallic, when it must be boiled for a few minutes, and filtered for use. Copper medals, etc., previously thoroughly cleaned from grease and dirt, are to be steeped in the liquor at the boiling point, until the desired effect is produced. Care must be taken not to keep them in the solution too long. When taken out, they should be carefully washed in hot water, and well dried. Gives an antique appearance.

5. (Chinese method.) Make a paste with 2 oz. each of verdigris and vermilion; 5 oz. each of alum and sal ammoniac, all in fine powder, and vinegar q. s.; then spread it over the surface of the copper, previously well cleaned and brightened, uniformly warm the article by the fire, and afterwards well wash and dry it, when, if the tint be not deep enough, the process may be repeated. The addition of a little blue vitriol inclines the color to a chestnut brown, and a little borax to a yellowish brown. Much employed by the Chinese for copper tea-urns.

6. Dissolve 1 oz. of sal ammoniac, 3 oz. cream of tartar, and 6 oz. of common salt, in 1 pint of hot water; then add 2 oz. of nitrate of copper, dissolved in $\frac{1}{2}$ a pint of water; mix well, and apply it repeatedly to the article, placed in a damp

situation, by means of a brush moistened therewith. Very antique.

7. Salt of sorrel $\frac{1}{4}$ oz.; sal ammoniac 1 oz.; distilled vinegar 2 $\frac{1}{2}$ pints; dissolve. As last.

BRONZE for Mortars.—Copper 93 parts; lead 5 parts; tin 2 parts. The edges and lips of mortars must be tempered by heating them to a cherry red, and then plunging them into cold water; as unless so treated, they are very apt to be broken.

BRONZE for Ornamental Work to be Gilded.—1. Copper 82 parts; zinc 18 parts; tin 3 parts; lead 2 parts.

2. Copper 83 parts; zinc 17 parts; tin 1 part; lead $\frac{1}{2}$ part.

BRONZE POWDER.—1. (*Beautiful red.*) Mix together sulphate of copper 100 parts; carbonate of soda 60 parts; apply heat until they unite into a mass, then cool, powder, and add copper filings 15 parts; well mix, and keep them at a white heat for twenty minutes, then cool, powder, and wash and dry.

2. (*Gold colored.*) Verdigris 8 oz.; tutty powder 4 oz.; borax and nitre, of each 2 oz.; bichloride of mercury $\frac{1}{4}$ oz.; make them into a paste with oil, and fuse them together. Used in japanning as a gold color.

3. Dutch leaf reduced to an impalpable powder by grinding.

4. (*Iron colored.*) Plumbago finely powdered.

5. (*Silver white.*) Melt together 1 oz. each of bismuth and tin, then add 1 oz. of running quick-silver; cool and powder.

BRONZE for Statuary.—1. Copper 88 parts; tin 9 parts; zinc 2 parts; lead 1 part.

2. Copper 82 $\frac{1}{2}$ parts; tin 5 parts; zinc 10 $\frac{1}{2}$ parts; lead 2 parts. These are very nearly the proportions in the celebrated statue of Louis XV.

3. Copper 90 parts; tin 9 parts; lead 1 part.

4. Copper 91 parts; tin 9 parts.

BRONZING, Surface.—This term is applied to the process of imparting to the surfaces of figures of wood, plaster of Paris etc., a metallic appearance. This is done by first giving them a coat of oil or size varnish, and when this is nearly dry, applying with a dabber of cotton or a camel-hair pencil, any of the metallic bronze powders; or the powder may be placed in a little bag of muslin, and dusted over the surface, and afterwards finished off with a wad of linen. The surface must be afterwards varnished.

Paper is bronzed by mixing the powders up with a little gum and water, and afterwards burnishing.

Iron castings may be bronzed by thorough cleaning, and subsequent immersion in a solution of sulphate of copper, when they acquire a coat of the latter metal. They must be then washed in water.

BRONZE (VINEGAR), for Brass.—Vinegar, 10 gals.; blue vitriol, 3 lbs.; muriatic acid, 3 lbs.; corrosive sublimate, 4 grs.; sal ammonia, 2 lbs.; alum, 8 oz.

BUTCHER KNIVES.—In forging out the knife as you get it near to its proper thickness, be very careful not to heat it too high, and to water-hammer as for mill picks; when about to temper, heat only to a cherry-red and hold it in such a way that you can hold it plumb as you put it into the water, which prevents it from springing—put it plumb into the water and it will come out straight.

Take it from the water to the fire and pass it

through the blaze until a little hot; then rub a candle over it upon both sides and back to the fire, passing it backward and forward, in the blaze, turning it over often to keep the heat even over the whole surface, until the tallow passes off as though it went into the steel; then take out and rub the candle over it again (on both sides each time) and back to the fire, passing it as before, until it starts into a blaze, with a snap, being careful that the heat is even over the whole length and width of the tool, then rub the tallow over it again and back, for 3 times, quickly as it burns off; and lastly rub the tallow over it again and push it into the dust of the forge, letting it remain until cold.

If these directions are followed with dexterity you will have the temper alike from edge to back; and the edge will be the best ever made.

CARAT.—The carat is an imaginary weight, that expresses the fineness of gold, or the proportion of pure gold in a mass of metal; thus, an ounce of gold is divided into 24 carats, and gold of 22 carats fine is gold of which 22 parts out of 24 are pure, the other two parts being silver, copper, or other metal; the weight of four grains, used by jewelers in weighing precious stones and pearls, is sometimes called diamond weight—the carat consisting of 4 nominal grains, a little lighter than 4 grains troy, or $74\frac{1}{16}$ carat grains being equal to 72 grains troy. The term or weight carat derives its name from a bean, the fruit of an Abyssinian tree, called kuara. This bean, from the time of its being gathered varies very little in its weight, and seems to have been, from a very remote period, used as a weight for gold in Africa. In India also the bean is used as a weight for gems and pearls.

CASTING Delicate Objects in Metal, as done in India.—The goldsmiths and silver workers always prefer the curious clay compound prepared by the white ants, and taken out of their huge honeycomb abodes, for forming the tiny crucibles used in their arts; it burns beautifully without cracking, when taken from a proper locality, but is more frequently found full of grit, and too friable after repeated washings, to hold together. The stomachs of these "white ants" are evidently supplied with a powerful chemical secretion, and this, doubtless combining with certain clays and earths, constitutes the useful crucible product. It burns to a hard white vessel, on which the borax of the artisan gives a brilliant internal glaze; but this earth is never used for any but the diminutive melting pots alluded to. White ants, if they "swarm" or "lodge" for a short time on sheet glass, corrode the same in zigzag patterns, as if etched by fluoric acid; occasionally these marks resemble Persian characters or Egyptian hieroglyphics. Hence some potent chemical acid enters into their building composition, of which the tenacity in some countries, when it has been well kneaded, pounded, and sun-dried, renders it a fine cheap flooring for settlers' houses. It is very generally used in South Africa.

In casting small articles in brass and the cheaper metals, they fix the mold with iron wire to the mouth of the melting pot, well luting the connections repeatedly with a mixture of stiff clay and cow-dung kneaded together till quite strong and safe, gradually warming the luting at the mouth of the furnace, and repairing all cracks and fissures as they may appear; when thorough-

ly dry, the whole mass is put in the rude native furnace of common clay; and on the contents of the melting pot being fused, it is turned gently "topsy turvy" and the metal runs from its inverted mouth into the attached mold. For articles of ornament and elaborate design, of any size, even to a field piece, the native workman makes a composition of two parts "dammar" resin, and one part beeswax (common resin will replace the first in America); these are very slowly and carefully melted over charcoal, and stirred together (in the open air, and not under a roof), and when almost hard are molded by the hands, the lathe, or in metallic shapes. These models in their turn are then encased in suitable mold clay, and very carefully and slowly dried in a shady spot until perfectly hard and seasoned. The workman then, over charcoal, gently heats the mold and pours out the composition from the hole he left as a future "ingate;" when every particle of the mixture has flowed out into a vessel held to catch it for future use, he increases his fire till smoke rises from the interior of his mold, and it is gradually brought to a condition to receive the molten metal. From an earring to an idol this is the favorite *modus operandi* of casting, and it can be most thoroughly recommended to the ingenious amateur, if he be not already practicing it. Bismuth is so very highly priced in India that "fusible metal" is never employed; the present mode, besides being cheaper, gives a sharper casting, especially for small jewelry, and tiny silver ornaments, to say nothing of avoiding the contamination of precious metals by the lead of the alloy.

There is great reason for supposing that in the days of "human sacrifices," models of the entire figure were obtained by casts of the victims who were immolated, in substantial clay coverings, which, when red hot, were filled with molten gold or silver, and gave the perfect images required by the priesthood. The delicate German castings of flowers and insects are nowadays cast in the same fashion—"burning out." Fish and reptiles, such as snakes and lizards, may be so cast very life-like in tin, and afterwards bronzed.

CASTING METALS, New Process of.—Any design, whether in high or low relief, chased on metal of any required pattern or shape, whether flat as a door-plate or round as a vase, can be reproduced by casting *ad infinitum*, and each casting will show upon it all the sharpness of the original chasing. Molds are made with a preparation of fine clay. The making of one of these molds takes from five to ten minutes. They have then to stand twenty-four hours exposed to dry air, after which they are baked in a furnace for eight hours. These clay molds, into which the metal is afterwards poured, are, to all intents and purposes, encaustic tiles. The molds are placed in a box, and the air is extracted from them so as to form a vacuum, after which the molten metal is forced into them; and in this way in ten minutes a casting can be completed. When the casting is taken out, the design, however intricate, is found to be perfectly represented, with the exception of removing a slight surface of clay from it, which can be done in half an hour, and the article is then ready to be sent to the bronzer, instead of having to be put in the chaser's hands. In this way an enormous amount of cost and labor on ornamental articles in metal is saved.

CASTINGS, Soldering.—First dip the castings in alcohol, after which, sprinkle muriate of ammonia (sal-ammoniac) over the surface to be soldered. Then hold the casting over a charcoal fire till the sal-ammoniac begins to smoke, then dip into melted tin (not solder). This prepares the metal for soldering, which can then be done in the ordinary way.

CAST-IRON, To Soften for Drilling.—Heat to a cherry red, having it lie level in the fire, then with a pair of cold tongs put on a piece of brimstone, a little less in size than you wish the hole to be when drilled, and it softens entirely through the piece; let it lie in the fire until a little cool, when it is ready to drill.

CAST-IRON, To Weld.—Take of good clear white sand, three parts; refined solton, one part; fosterine, one part; rock-salt, one part; mix all together. Take 2 pieces of cast-iron, heat them in a moderate charcoal-fire, occasionally taking them out while heating, and dipping them into the composition, until they are of a proper heat to weld; then at once lay them on the anvil, and gently hammer them together, and, if done carefully by one who understands welding iron, you will have them nicely welded together. One man prefers heating the metal, then cooling it in the water of common beans, and heat it again for welding.

CAST-STEEL, English.—The finest of steel, called English cast-steel, is prepared by breaking to pieces blistered steel, and then melting it in a crucible with a flux composed of carbonaceous and vitrifiable ingredients. The vitrifiable ingredient is used only inasmuch as it is a fusible body, which flows over the surface of the metal in the crucibles, and prevents the access of the oxygen of the atmosphere. Broken glass is sometimes used for this purpose.

When thoroughly fused it is cast into ingots, which, by gentle heating and careful hammering, are tilted into bars. By this process the steel becomes more highly carbonized in proportion to the quantity of flux, and in consequence is more brittle and fusible than before. Hence it surpasses all other steel in uniformity of texture, hardness, and closeness of grain, and is the material employed in all the finest articles of English cutlery.

CAST-STEEL, To Restore when Burnt.—Take $1\frac{1}{2}$ pounds borax, $\frac{1}{2}$ pound sal-ammoniac, $\frac{1}{4}$ pound prussiate of potash, 1 ounce rosin. Pound the above fine, add a gill each of water and alcohol. Put in an iron kettle, and boil until it becomes a paste. Do not boil too long, or it will become hard on cooling.

CAST-STEEL and IRON, To Make Edgetools from.—This method consists in fixing a clean piece of wrought iron, brought to a welding heat, in the center of a mold, and then pouring in melted steel, so as entirely to envelop the iron; and then forging the mass into the shape required.

CASE-HARDENING.—The operation of giving a surface of steel to pieces of iron, by which they are rendered capable of receiving great external hardness, while the interior portion retains all the toughness of good wrought iron. Iron tools, fire-irons, fenders, keys, etc., are usually case-hardened.

1. The goods, finished in every respect but polishing, are put into an iron box, and covered with animal or vegetable charcoal, and cemented

at a red heat, for a period varying with the size and description of the articles operated on.

2. Cow's horn or hoof is to be baked or thoroughly dried, and pulverized. To this add an equal quantity of bay salt; mix them with stale chamber-lye, or white wine vinegar; cover the iron with this mixture, and bed it in the same in loam, or inclose it in an iron box; lay it then on the hearth of the forge to dry and harden; then put it into the fire, and blow till the lump have a blood-red heat, and no higher, lest the mixture be burnt too much. Take the iron out, and immerse it in water to harden.

3. The iron, previously polished and finished, is to be heated to a bright red and rubbed or sprinkled over with prussiate of potash. As soon as the prussiate appears to be decomposed and dissipated, plunge the article into cold water.

4. Make a paste with a concentrated solution of prussiate of potash and loam, and coat the iron therewith; then expose it to a strong red heat, and when it has fallen to a dull red, plunge the whole into cold water.

CASE SPRINGS, for Watches, To Temper.—Having fitted the spring in the case according to your liking, temper it hard by heating and plunging into water. Next polish the small end so that you may be able to see when the color changes; lay it on a piece of copper or brass plate, and hold the plate over your lamp, with the blaze directly under the largest part of the spring. Watch the polished part of the steel closely, and when you see it turn blue remove the plate from the lamp, letting all cool gradually together. When cool enough to handle polish the end of the spring again, place it on the plate and hold over the lamp as before. The third bluing of the polished end will leave the spring in proper temper. Any steel article to which you desire to give a spring temper may be treated in the same way.

Another process said to be good is to temper the spring as in the first instance; then put it into a small iron ladle, cover it with linseed oil and hold over a lamp till the oil takes fire. Remove the ladle, but let the oil continue to burn until nearly all consumed, when blow out, recover with oil and hold over the lamp as before. The third burning out of the oil will leave the spring in the right temper.

CLOCKS, To Clean and Repair.—Take the movement of the clock "to pieces." Brush the wheels and pinions thoroughly with a stiff, coarse brush; also the plates into which the trains work. Clean the pivots well by turning in a piece of cotton cloth held tightly between your thumb and finger. The pivot holes in the plates are generally cleansed by turning a piece of wood into them, but it will be found that a strip of cloth or a soft cord drawn tightly through them will act the best. If you use two cords, the first one slightly oiled, and the next dry to clean the oil out, all the better. Do not use salt or acid to clean your clock—it can do no good, but may do a great deal of harm. Boiling the movement in water, as some practice, is also foolishness.

The holes through which the great arbors, or winding axles work, are the only ones that usually require bushing. When they have become too much worn the great wheel on the axle before named strikes too deeply into the pinions above it, and stops the clock. To remedy this bushing is necessary, of course. The most common way

of doing it is to drive a steel point or punch into the plate just above the axle hole, thus forcing the brass downward until the hole is reduced to its original size. Another mode is to solder a piece of brass upon the plate in such a position as to hold the axle down to its proper place. If you simply wish your clock to run, and have no ambition to produce a bush that will look workmanlike, about as good a way as any is to fit a piece of hard wood between the post which comes through the top of the plate and the axle. Make it long enough to hold the axle to its proper place and so that the axle will run on the end of the grain. Cut notches where the pivots come through, and secure by wrapping around it and the plate a piece of small wire, or a thread. There is no post coming through above the axle on the striking side, but this will rarely require bushing.

To remedy worn pinions turn the leaves or rollers so the worn places upon them will be towards the arbor or shaft, and fasten them in that position. If they are "rolling pinions," and you cannot secure them otherwise, you had better do it with a little soft solder.

Oil only, and very lightly, the pallets of the verge, the steel pin upon which the verge works, and the point where the loop of the verge wire works over the pendulum wire. Use none but the best watch oil. Many jobs of clock cleaning are spoiled by oiling all the pivots and probably the pinions. The doing of this causes their accumulation of dust, and this dust mixing with the oil, by grinding together increases the friction of the parts, and sooner or later, the stoppage of the clock. We often hear persons complaining of their clocks stopping in cold weather—in nine cases out of ten the cause may be attributed to this very injudicious use of oil. A gum has formed on the pivots or pinions, or both, which stiffens under the influence of the cold, and, of course, stops the movement. But this is not the only bad result. A clock grinding along in consequence of having been improperly oiled, will wear out in less than half the time that it would under other circumstances. The reason in this must be apparent to all—each pivot or each pinion leaf has been converted, as it were, into a grindstone.

If not very cautious in putting up your clock you will get some of the striking-train wheels in wrong, and thus produce a derangement in the striking. If this should happen, prize the plates apart on the striking side, slip the pivots of the upper wheels out, and having disconnected them from the train, turn them part around and put them back. If still not right, repeat the experiment. A few efforts at most will get them to working properly.

Always examine the pendulum wire at the point where the loop of the verge wire works over it. You will generally find a small notch, or at least a rough place, worn there. Dress it out perfectly smooth, or your clock will not be likely to work well. Small as this defect may seem, it stops a large number of clocks.

COINS etc., To take Impressions from.—Make a thick solution of isinglass in water, and lay it hot on the metal; let it remain for twelve hours, then remove it, breathe on it and apply gold or silver-leaf on the wrong side. Any color may be given to the isinglass instead of gold or silver, by simple mixture.

COPPER, To Whiten Throughout.—Take thin plates of copper, as thin as a knife, heat them six or seven times, and quench them in water; then melt them, and to each pound add 4 ounces of saltpetre and 4 ounces of arsenic, well powdered and mixed, and first melted apart in another crucible, by gentle degrees; then take them out, and powder them; then take Venetian borax and white tartar, of each an ounce and a half; then melt these, with the former powder, in a crucible, and pour them out into some iron receiver; it will appear as clear as crystal, and is called *crystallinum fixum arsenicum*. Of this clear matter, broken into little pieces, throw into the melted copper (by small pieces at a time, staying five or six minutes between each injection) 4 oz.; when all is thrown in, increase the fire, till all be well melted together for a quarter of an hour; then pour it out into an ingot.

COPPER SOLUTION for Battery.—To every gallon of saturated solution of sulphate of copper, add $2\frac{1}{2}$ ounces of strong sulphuric acid and $\frac{1}{2}$ drachm white arsenic. If single cell, place a bag of sulphate in the solution just below the surface, to keep up the strength.

COPPER Powder.—This is prepared by dissolving filings or slips of copper with nitrous acid in a receiver. When the acid is saturated, the slips are to be removed; or, if filings be employed, the solution is to be poured off from what remains undissolved. Small bars are then put in, which will precipitate the copper-powder from the saturated acid; and, the liquid being poured from the powder, this is to be washed clean of the crystals by repeated waters.

COPPER, To Tin for Stew-Dishes or other Purposes.—Wash the surface of the article to be tinned, with sulphuric acid; and rub the surface well, so as to have it smooth and free of blackness caused by the acid; then sprinkle calcined and finely pulverized sal-ammoniac upon the surface, holding it over a fire where it will become sufficiently hot to melt a bar of solder which is to be rubbed over the surface; if a stew-dish put the solder into it and swab it about when melted. You will wipe off any surplus solder, and also for the purpose of smoothing the surface, by means of a tow or cotton swab, tied or tacked to a rod. In this way any dish or copper article may be nicely tinned.

COPPER, To Silver.—Silver dust (fine), one ounce; common salt and sal ammoniac, of each four ounces; corrosive sublimate, a quarter of an ounce. Mix. The copper must be previously well cleaned by friction, adding a little warm water to form a paste.

COPPER, To Deposit upon Cast-iron.—The pieces of cast-iron are first placed in a bath made of 50 parts of hydrochloric acid, at 15° Beaumé (sp. gr., 1.105), and 1 part of nitric acid; next, in a second bath, composed of 10 parts of nitric acid, 10 parts of chloride of copper, dissolved in 80 parts of the same hydrochloric acid as just alluded to. The objects are rubbed with a woolen rag and a soft brush, next washed with water, and again immersed until the desired thickness of copper is deposited. When it is desired to give the appearance of bronze, the coppered surface is rubbed with a mixture of 4 parts of sal ammoniac and 1 each of oxalic and acetic acids dissolved in 30 parts of water.

COPPER and BRASS, To Tin.—Boil 6 lbs. of cream of tartar, 4 gals. of water, and 8

lbs. of grain-tin, or tin shavings. After the materials have boiled a sufficient time, the substance to be tinned is put therein and the boiling continued, when the tin is precipitated in its metallic form.

COPPER, BRASS AND IRON, To Tin in the cold and without Apparatus.—The requisites for accomplishing this object are: 1st. The object to be coated with tin must be entirely free from oxide. It must be carefully cleaned, and care be taken that no grease spots are left; it makes no difference whether the object be cleaned mechanically or chemically. 2d. Zinc powder; the best is that prepared artificially by melting zinc and pouring it into an iron mortar. It can be easily pulverized immediately after solidification; it should be about as fine as writing sand. 3d. A solution of protochloride of tin, containing 5 to 10 per cent., to which as much pulverized cream of tartar must be added as will go on the point of a knife. The object to be tinned is moistened with the tin solution, after which it is rubbed hard with the zinc powder. The tinning appears at once. The tin salt is decomposed by the zinc, metallic tin being deposited. When the object tinned is polished brass or copper, it appears as beautiful as if silvered, and retains its luster for a long time. The author uses this method in his laboratory to preserve his iron, steel and copper apparatus from rust. This method would become of great importance if the tinning could be made as thick as in the dry way, but this has not as yet been accomplished.

COPPER and BRASS, To Coat with Zinc.—In order to do this, it is simply necessary to immerse the articles in a boiling bath of sal ammoniac containing zinc-foil or powdered zinc. The deposit thus made is brilliant and adheres firmly.

COPPER and BRASS (Polished), To Clean.—Copper tea-kettles, boilers, and other household articles having polished surfaces should not be allowed to get rusty, as rust will destroy more of the metal than is used up by the ordinary wear of the utensils. If the surface be rubbed but a little every day, the labor of keeping them bright will be very light. In case a rust has formed on the surface, apply a solution of oxalic acid, which, well rubbed over tarnished copper or brass, will soon remove the tarnish, rendering the metal bright. The acid must be washed off with water, and the surface rubbed with whitening and soft leather. A mixture of muriatic acid and alum, dissolved in water, imparts a golden color to brass articles that are steeped in it for a few seconds. To give a finer polish, go over the surface of the metal with rotten-stone and sweet-oil; then rub off with a piece of cotton flannel and polish it with soft leather.

DIAMONDS, Imitation.—Imitation diamonds are plenty enough, and in their fabrication considerable skill is often displayed, and the imitation is at times very clever; it appears, however, that there is a prospect that real diamonds will eventually be manufactured. Hitherto though chemists have had no difficulty in discovering of what diamonds were composed, they have never succeeded in producing them. Diamonds are chemically the same as charcoal, and they may be readily converted into it, but the more satisfactory transmutation of charcoal into diamonds proved a most tantalizing mystery. At last we hear of the secret being discovered, and

the discoverer, instead of privately profiting by it, makes it public. It is said to be simply this: If a current of chlorine be made to pass through cast-iron, when in a state of fusion, perchloride of iron is formed, which disappears by evaporation, leaving the carbon of the metal at liberty in a crystallized state, forming either black, colorless or colored diamonds.

DIN OF SHOPS, To Prevent.—A rubber cushion under the leg of work-benches in manufacturing, is a cheap relief from the deafening din of noisy shops. Chambers' Journal describes a factory where the hammering of fifty copper-smiths was scarcely audible in the room below, their benches having under each leg a rubber cushion. We have seen the same effect produced by standing the legs of the bench in nail-legs filled with sand, by which means all vibration and shock was prevented.

DRILLS and GRAVERS, To Temper.—When the graver or drill is too hard, which may be known by the frequent breaking of the point, temper as follows: Heat a poker red hot, and hold the graver to it within an inch of the point, waving it to and fro till the steel changes to a light straw color; then put the point into oil to cool, or hold the graver close to the flame of a candle till it be of the same color and cool in tallow; but be careful either way not to hold it too long, for then it will be too soft, in which case the point will be blue, and must be broken off and whetted and tempered anew.

DRILLS, (Jeweller's), To Temper.—Select none but the finest and best steel for your drills. In making them never heat higher than a cherry red, and always hammer till nearly cold. Do all your hammering in one way, for if, after you have flattened your piece out, you attempt to hammer it back to a square or a round you spoil it. When your drill is in proper shape heat it to a cherry red, and thrust it into a piece of resin, or into quicksilver.

ELAINE, To obtain Pure.—Olive oil, 1 part; alcohol, 9 parts. Mix and heat to the boiling point, in a close vessel, then allow it to cool, and place it in a freezing mixture until the whole of the stearine is deposited, then decant the clear and distill off the alcohol in a water-bath, the remainder will be pure elaine. This elaine or pure oil will not freeze in frosty weather, and neither thickens nor corrodes when applied to metals. It is a perfect cure for "lame" chronometers, watches, &c.

ELECTRO-COPPERING.—Make a strong solution of sulphate of copper (boiling water will dissolve the most) and strain it. Connect to the wire from the zinc pole of the battery, a clean plate of copper, and place it in the solution. Suspend from a rod across the top of the bath, by means of wire, the articles to be coppered, care being taken that they do not touch each other, and connect this rod with the other pole of the battery. Smee's battery and the electro-poison battery are the best for this kind of work.

ELECTRO-GILDING and SILVERING.—*The Gold Bath.*—Gilding can be done either hot or cold; in each case the composition of the bath is the same, only the gilding with a warm bath is generally richer in tone, and may sometimes render coloring unnecessary. With a cold bath, necessitated by the difficulty of heating large masses of liquid for the production of bulky articles, coloring is always indispensable. Gild-

ing by cold baths has nearly disappeared from workshops where steam is employed.

The baths are formed of double cyanide of gold and potassium. Dissolve 2 oz. of gold in *aqua regia*; evaporate the solution to a sirupy consistence; redissolve it in warm water, and add, little by little, $2\frac{1}{2}$ lbs. of cyanide of potassium, previously dissolved in water. This will make about thirteen gallons of bath. It is best not to employ it until it has been boiled several hours. The most suitable temperature for the bath, when in operation, is 160° Fahr.

Immerse in the bath a plate of gold put in communication with the positive pole, and which serves to feed the bath continually. In proportion as the gold is deposited upon the object to be gilt placed at the negative pole, a nearly equal quantity of gold is dissolved at the positive pole, and maintains the bath in the same state of saturation.

By this arrangement the cold baths acquire great durability; it is also applied to warm baths, but they deteriorate very quickly. The cyanide of potassium is destroyed by a prolonged boiling. The electric current is furnished by a Bunsen's battery, the number of cells being regulated by the nature of the article to be gilt.

Before putting the articles into the bath, they are rinsed in alcohol, in order to dissolve the greasy matters by which they are soiled; next into a bath of dilute nitric acid; then into a bath of acid nitrate of mercury, strength 4 per cent.; and lastly, rinsed in abundance of water; the articles are then ready to be immersed in the gold bath. The time of the immersion varies according to the thickness to be given to the coating, and is in direct proportion with the weight of gold deposited.

To ascertain the weight of gold deposited, two weighings are necessary; the first, when the articles are about to be put into the bath; the second, upon the gilt and dried articles.

All the metals gilt equally well in the above bath, but steel requires a more concentrated solution, or, what is better, a previous coppering in an alkaline bath. Aluminum can not be gilt directly; it must be coppered also. In this case, an acid copper bath is best for the purpose.

Reserves.—By means of reserves we may obtain various artistic effects, for which taste is the only guide. The most suitable varnish for this kind of work is composed of copal varnish, oil, and chromate of lead. This varnish is applied with a hair-pencil to all those parts of the article where it is not wished that the metal should be deposited. When it is allowed to dry properly, it is not attacked by acid or alkaline solutions. It is completely dissolved by essence of turpentine or light coal-oil.

Green and Red Gilding.—We may obtain green gold and red gold directly by the battery. For green gold, a solution of the double cyanide of silver and potassium is added to the gold bath until the desired color is obtained; then we operate with an anode of gold alloy. In this process, as in all those which have for their aim the deposit of metallic alloys, it is very important to well proportion experimentally the surface of the anode to that of the article to be gilt. To obtain red gold, a solution of cyanide of potassium and copper is added to the gold bath. But the result is obtained more easily with the mixture formerly employed by the mercury-gilders, which

consisted of 25 parts of acetate of copper, 65 of cream of tartar, and 10 of table-salt, applied with a soft brush. The articles are heated over charcoal until the salts assume a brownish color; they are then cooled in water acidulated with nitric acid.

Upon removal from the gold bath, the articles are generally of a tarnished color, in which state they are unfit for sale. They have, therefore, to undergo several operations with the scratch-brush, and coloring and burnishing.

Polishing.—This operation is performed with a scratch-brush of brass wire, the diameter of which varies according to the delicacy of the article. It is always performed under a liquid—generally licorice-water—the object of which is to form a light mucilage, which admits of the scratch-brush rubbing the gilt article less roughly.

For smooth surfaces, the hand-labor is replaced by the wheel. Upon an axle revolving 600 times a minute a mandrel of copper is mounted, furnished with a brass wire brush; a reservoir above constantly supplies the brush with the mucilaginous liquid, which flows into a lower receptacle. One workman can accomplish as much with the wheel as ten without it.

Coloring is performed by means of a mixture called *ormolu*, and composed of 30 parts of alum, 30 of nitrate of potassa, 30 of red ochre, 8 of sulphate of zinc, 1 of common salt and 1 of sulphate of iron. It is applied with a soft brush. The articles are placed over a clear charcoal fire until the salts, melted and dried, assume a brown aspect; they are then suddenly cooled in nitric acid water containing 3 per cent. of hydrochloric acid; afterwards washed in abundance of water and dried with sawdust.

Burnishing is effected by means of hard stones—agates, hematites—mounted in strong wooden handles, or with tools of highly-polished steel.

Flat Gilding.—Starting with the principle, "As is the surface so is the gilding," if we can obtain a perfectly mat surface before gilding, it is evident that we shall have very little to do in order to retain this aspect after gilding. The result has been obtained by previously depositing a mat coating of a less costly metal than gold, the deposit of which can be easily regulated.

Silver and copper equally accomplish this aim. The silvering is performed in baths, which will be described elsewhere; only the silver bath must not contain more than eight grains of silver per 1000, and the deposit must be made slowly with a very weak current. The coppering is performed in the usual baths of sulphate of copper, after a first coating given in the alkaline copper bath. The time of immersion and the energy of the pile are conditions which a little practice will soon teach.

The articles being perfectly mat, are conveyed to a more dilute gold bath than that prescribed above, which is worked warm. It must not contain more than five grains per 1000. It is important to continually move the articles about in the bath, and to manœuvre the anode so as to render the color uniform. Gilding upon copper, less costly than gilding upon silver, is usually of an inferior tone of color, and more liable to oxidize; so the latter metal is generally preferred.

The metals deposited under the influence of the electric battery do not always present the same physical characters.

Sometimes the deposit is rough and brittle, at

others soft and flexible; sometimes it possesses intermediate qualities, and is as perfect in its physical properties as the best rolled copper; lastly it may be deposited under the form of a non-adherent crystalline powder.

These different molecular states depend on the relations which must exist among the four following conditions: 1st, the proportions of the two electrodes; 2d, the strength of the solutions; 3d, the temperature at which the operation is carried on; 4th, the intensity of the pile.

In all cases, it is important that the relative surfaces of the anode and the articles in communication with the negative pole be nearly equal. A positive electrode larger than the negative electrode tends to produce a crystalline deposit, which may extend to the pulverulent state, if the difference in their dimensions is very considerable. By working with a too concentrated solution, the deposit is rough and brittle; increasing the intensity of the battery will restore the deposit to its normal state.

If the bath be too weak, or the temperature be too low, the deposit slackens, and assumes a crystalline appearance, which may be easily made to disappear by raising the temperature, or by diminishing the intensity of the pile. If the temperature be too high, the deposit will become pulverulent. This may be remedied by diminishing the power of the pile employed. The regulation of the intensity of the current is, in most cases, the remedy to apply to the accidents that occur.

Therefore, it is on the perfect equilibrium among these four conditions that the galvanic precipitation of a metal with all its special qualities of ductility and malleability depends. The operator soon acquires the means of working satisfactorily.

In those cases in which a simple cell is employed, the success of the operation depends on the relation between the zinc surfaces and the number of articles to be coated.

With perfectly saturated solutions and a weak current, success is certain.

ELECTRO-PLATING Brass or Zinc without a Battery.—Take a cold, saturated solution of cupric sulphate, (blue vitriol,) and pour in a solution of potassic cyanide, till the precipitate first formed is dissolved again. After the liquid has become clear, add one tenth to one fifth of its volume of liquid ammonia, and dilute with water till Beaumé's hydrometer for heavy liquids indicates 8°, corresponding with a specific gravity of 1.06. As during this operation the very poisonous hydrocyanic (prussic) acid is developed, in the form of vapor, it is necessary to perform it either in the open air, or under a flue with good draught, and to avoid the fumes.

Then take the zinc objects, and clean them with diluted sulphuric acid, pumice-stone and sand, wash them with water, and place them for twenty-four hours in the above-described liquid. After which, when taken out and washed with water, they will be found covered with a film of copper.

In order to cover with brass, pour into a saturated solution of equal parts of cupric and zincic sulphate (blue and white vitriol) the solution of potassic cyanide, until the precipitate is dissolved again, and add the same quantity of ammonia as before—one tenth to one fifth. If a pale brass is desired, take two parts of zincic

sulphate to one of cupric sulphate, (vitriol,) and proceed as already described.

In case zinc objects are to be gilded, it is necessary to cover them first with copper, on which the gold deposits better than on zinc. It is the same with iron objects. This metal, however, is much more easily covered with copper than zinc is, iron requiring only an immersion in a solution of cupric sulphate.

ELECTRO-PLATING Glass Mirrors.—The platinized mirrors are not electro-plated, the platinum solution is simply put on the glass and the metal precipitated by heat and purely chemical action. To make the solution, take chloride of platinum, and if you can not obtain it from some chemist, you may easily make it by dissolving half an ounce of platinum in aqua regia and evaporating to dryness in order to remove all excess of acid, applying only a moderate heat in order not to reduce the platinum back to its metallic state. This chloride of platinum is then rubbed up on a glass plate with oil of lavender, adding the oil carefully little by little so as not to cause the mixture to become too hot, which would result in a failure. After adding nearly two ounces of oil, the mixture is left for two weeks to settle, when the liquid is poured off from the sediment and filtered. After another week's rest, 1 drachm of litharge and 1 drachm of borate of lead are rubbed up with 1 scruple of lavender oil, and this mixture added to the platinum mixture only as it is to be used. The mixture is then put on the glass and gradually dried, when the glass is introduced into a properly constructed furnace, similar to a muffle furnace; at the red heat the oil is decomposed, its carbon and hydrogen reduces the platinum to the metallic state, and mingling with the easily fusible lead and borax glass formed on the surface, melts into the surface of the glass plate and forms the platinum mirror, so much admired for their property of reflecting light from both sides, while at the same time they are transparent enough to make strongly illuminated objects visible through them. As it takes for every square foot scarcely 1 grain of platinum, it is seen that the coating is very thin, showing the great divisibility of this metal; and as 1 grain of platinum costs less than 2 cents, the process is not expensive, the labor and other materials used amounting to more than the expense of the platinum.

ELECTRO-PLATING Silver on Iron.—The common practice among electro-platers is to immerse the steel or iron, first in a bath of sulphate of copper, and connect it for a short time with a not too strong battery, so as to obtain a thin, even film of metallic copper. On this the silver may then easily be deposited.

ELECTRO-PLATING German Silver on other Metals.—Take the chlorides of the three metals which constitute German silver and mix them in proportion as they are in that alloy; that is, for the basest: 1 nickel, 4 zinc, and 5 copper; for the best or imitation silver of Frick: 3 nickel, 2 zinc, and 8 copper; and the Chinese white copper: 6 nickel, 5 zinc, and 8 copper; all other German silver alloys are between these, so it will be seen that a wide latitude exists. These chlorides are made by dissolving the respective metals in hydrochloric acid, and driving off the excess by a moderate heat. When dissolved in water, a concentrated solution of cyanide of potassium is added, and in this way the cyanides of the

metals are formed which precipitate, and are re-dissolved again by adding more of the cyanide solution. We thus obtain a solution of the cyanides of the metals in cyanide of potassium, the same as was obtained in the solution for electroplating brass. The solution is then moderately heated in a cast-iron vessel, and the objects to be plated suspended in the same after having been carefully cleaned and connected with the zinc pole of the battery; on the other pole of the battery, of course, a plate of German silver is suspended, of a similar alloy in order to keep the solution uniform, as from this plate the same amount is dissolved as is deposited on the objects plated.

ELECTRO-PLATING, Gold solution for.—Dissolve five pennyweights gold coin, five grains pure copper and four grains pure silver in three ounces nitromuriatic acid; which is simply two parts muriatic acid and one part nitric acid. The silver will not be taken into solution as are the other two metals, but will gather at the bottom of the vessel. Add one ounce pulverized sulphate of iron, half an ounce pulverized borax, twenty-five grains pure table salt, and one quart hot rain water. Upon this the gold and copper will be thrown to the bottom of the vessel with the silver. Let stand till fully settled, then pour off the liquid carefully, and refill with boiling rain water as before. Continue to repeat this operation until the precipitate is thoroughly washed; or, in other words, fill up, let settle, and pour off so long as the accumulation at the bottom of the vessel is acid to the taste.

You now have about an eighteen carat chloride of gold. Add to it an ounce and an eighth cyanuret potassa, and one quart rain water—the latter heated to the boiling point. Shake up well, then let stand about twenty-four hours and it will be ready for use.

Some use platina as an alloy instead of silver, under the impression that plating done with it is harder. I have used both, but never could see much difference.

Solution for a darker colored plate to imitate Guinea gold may be made by adding to the above one ounce of dragon's blood and five grains iodide of iron.

If you desire an alloyed plate, proceed as first directed, without the silver or copper, and with an ounce and a half of sulphuret potassa in place of the iron, borax and salt.

ELECTRO-PLATING, Silver solution for.—Put together into a glass vessel, one ounce good silver, made thin and cut into strips; two ounces best nitric acid and half an ounce pure rain water. If solution does not begin at once, add a little more water—continue to add a very little at a time till it does. In the event it starts off well, but stops before the silver is fully dissolved, you may generally start it up again all right by adding a little more water.

When solution is entirely effected, add one quart of warm rain water and a large tablespoonful of table salt. Shake well and let settle, then proceed to pour off and wash through other waters as in the case of the gold preparation. When no longer acid to the taste, put in an ounce and an eighth cyanuret potassa and a quart pure rain water; after standing about twenty-four hours it will be ready for use.

ELECTRO-PLATED GOODS, To remove Tarnish from.—Make a solution of half a pound

cyanuret potassa in two gallons rain water. Immerse the article till the tarnish has disappeared, then rinse off carefully in three or four waters, and dry in sawdust.

ELECTROTYPING.—The object sought to be attained by electrotyping is, by means of the action of the electricity generated by a galvanic pile or battery, to precipitate a metal from its solution upon a given subject in a continuous uniform coating, so that this coating is an exact copy of all the details on the surface of the object. This coating may be adherent when it is desired to protect an inferior metal by a superior, as when copper is plated with silver; or the coating may be non-adherent when deposited in a mould, as in the reproduction of antique bronzes, etc.

The electric current employed is usually supplied by the "constant battery," known as Daniell's, or by a Bunsen's battery. The apparatus is either simple or compound. In a simple apparatus, the mould, the object upon which the precipitated metal must be deposited, forms an essential portion of the electric current. In a compound apparatus, the battery is outside the bath to be decomposed, and the mould is connected with the zinc pole; the copper or carbon pole is connected with the bath. The advantage derived from employing a compound apparatus consists in its enabling the operator to attach to the copper pole a soluble electrode, or *anode*: that is, a plate of the same metal as is held in solution in the bath, which plate becomes dissolved in nearly the same ratio as the metal is deposited upon the mould.

The electrotyping apparatus is termed *simple* when the galvanic current is produced in the same vessel as that in which the metallic deposit is effected. It is most frequently employed to obtain deposits of copper; but when deposits of the precious metals are required, the compound apparatus is preferred.

Into any suitable vessel, which may be of glass, earthenware, stoneware or wood, put the solution of the metal to be deposited—sulphate of copper, (blue vitriol,) for example—with which to cover the moulds with copper. Another vessel, of much smaller diameter, is placed in the center of the first vessel; it must be of porous material—unglazed porcelain, for instance. Sulphuric acid, diluted with from twelve to fifteen times its weight of water, is poured into the smaller vessel, and a plate or cylinder of amalgamated zinc suspended in it. The moulds are put in communication with the zinc by means of a copper wire. The solution becomes exhausted of its copper in proportion as it is deposited on the moulds, and must be renewed by suspending a bag of crystals of sulphate of copper in the bath.

When operations are carried on upon a large scale, the apparatus may be constructed in the following manner: a box of any required dimensions constructed of elm, oak, or any hard wood, is coated inside with pitch, marine glue, or gutta-percha. The box is divided into two compartments by a porous partition or diaphragm, which may be made of plaster of Paris or of parchment. If of plaster, it must not be more than half an inch in thickness, so that the intensity of the current may be diminished as little as possible.

The first compartment is nearly filled with a cold saturated solution of sulphate of copper, or of any other salt which it is intended to decompose. Into this solution the moulds are sus-

pended near the diaphragm. The second compartment is filled with water slightly acidulated, in which a plate of zinc, presenting a surface nearly equal to that of the mould, is suspended, about half an inch from the diaphragm. When matters are thus arranged, connection is established by means of a copper wire between the moulds and the zinc. As soon as the circuit is closed, an electric current results, in consequence of which the zinc becomes the positive pole, and the mould the negative pole; the sulphate of copper is decomposed, the sulphuric acid and the oxygen go to the zinc, which is dissolved; the hydrogen of the decomposed water then reduces the copper, which is deposited at the negative pole. The solution is kept in a state of saturation, as in the preceding case. The temperature should be maintained between 104° and 107° Fahr., to avoid crystallization; and as saturation is always more complete at the bottom of the vessel than at the top, the mould must be turned from time to time quickly, to prevent oxidation.

Another inconvenience is the unequal thickness of the deposit, always more abundant at the extreme opposite to the point of connection than at the point itself. This inconvenience is remedied by placing several conducting-wires along both ends of the mould, taking care to turn back those which are fixed to the lower edge.

The apparatus is *compound* when the galvanic current is produced outside the bath containing the solution to be decomposed. In this arrangement a current of any degree of strength may be employed, according to the size and number of cells forming the battery.

ELECTROTYPING, Daniell's Battery for.

The batteries generally employed are those of Daniell and Bunsen. The Daniell battery, as improved, consists of a copper vessel, about 7 in. in height, $5\frac{1}{2}$ in. in width, and $\frac{1}{4}$ of an in. in thickness, furnished with two appendages, forming a beveled pocket, communicating with the interior of the vessel by numerous apertures, and filled with crystals of sulphate of copper. A saturated solution of sulphate of copper is poured into the vessel, into which a linen bag is immersed, containing a plate of zinc, $4\frac{1}{2}$ inches wide. By means of two screws, the conducting wires may be adjusted to the poles, or the zinc element may be attached to the succeeding copper element.

Bunsen's Battery.—This, like Daniell's, is a constant battery. It is composed of a cylinder of amalgamated zinc, placed in an earthenware or glass vessel, containing diluted sulphuric acid. This cylinder surrounds a porous vessel, which contains a cylinder of carbon, dipping into nitric acid. To the upper portion of the zinc a strip of copper is soldered, the conical extremity of which fits tightly into an aperture pierced in the upper portion of the carbon of the adjoining element. By these means communication between the elements is established.

The negative pole is always at the extremity of the pile terminated by the zinc; the positive pole at the other extremity.

The best proportions of water and sulphuric acid to employ to form the acidulated water in which the zinc is immersed are one part acid to nine parts water. The nitric acid surrounding the carbon must be concentrated, but not fuming.

Smee's Battery.—This form of constant bat-

tery is mostly employed in the production and duplicating of copper plates. The voltaic couple consists of a plate of platinized silver placed between two surfaces of amalgamated zinc. The silver communicates by a wire with the positive pole of the decomposing apparatus, or the anode, which must be of equal surface with the mould. The zinc is connected by a wire, fastened by a screw to the mould placed at the negative pole of the decomposing apparatus. The voltaic apparatus must be charged with sulphuric acid diluted with fifteen or sixteen times its weight of water.

The decomposing apparatus may be either vertical or horizontal. If the latter, the mould must be placed at the bottom, else the deposit of copper will not be of uniform hardness. The vertical form is considered best for slow deposit; the horizontal is more appropriate for a rapid deposit of copper.

When the apparatus is filled with liquid, take a piece of copper of the same dimensions as the plate to be moulded or copied, and put it in communication with the silver of the battery. The battery being charged, the vessel filled with the solution, and the piece of copper to be dissolved (anode) being immersed in the solution and connected with the silver of the battery, the wire which is soldered to the plate or mould on which the deposit is to be made is put into communication with the zinc of the battery, and the operator must take especial care not to immerse this plate or mould in the solution until the last thing, in order to complete the circuit with it. These arrangements being properly made, we see a deposit of pure copper formed, which does not adhere to the original plate, on account of the film of air which separates them, or the very thin coating of wax with which the plate has been previously rubbed.

Definition of the Electric Current.—When the opposite poles of an electric pile are connected by a good conductor—as a copper wire, for example, the electricities are set in motion in the wire. The positive electricity passes from the positive to the negative pole, the negative electricity travels in the opposite direction. It will be perceived that there are two currents of electricity. To designate the direction in which they travel, it is only necessary simply to indicate the path the positive electricity takes; it being understood that the negative electricity takes the opposite direction.

Chemical Effect of the Battery.—If we attach a metallic wire to one of the poles, and a second wire to the other pole, and then immerse these two conductors (electrodes) in a saline solution—sulphate of copper, for example—taking care that the wires do not touch, we perceive that the metal of the salt in solution becomes deposited upon the negative electrode: the other elements of the salt go to the positive electrode.

The same experiment performed upon an alkaline or earthy salt, placed in solution in a U tube, gives the alkali at the negative pole and the acid at the positive pole.

From this it appears that the salts do not all behave in the same manner under the influence of the electric current; but the difference in the results observed is not due to a difference in the action of the current; it arises from the oxidizability of the alkaline and earthy metals, which, upon their arrival at the negative pole, decompose

the water and become oxidized, with a disengagement of hydrogen.

ELECTROTYPING, Baths for.—The apparatus by the aid of which we may decompose the various metallic combinations employed in electrotyping having been described, we proceed to give some details upon the combinations themselves.

Copper Baths.—The sulphate, chlorate, nitrate, and acetate are the combinations employed, especially the sulphate, on account of its cheapness. This salt presents a considerable resistance to the passage of the electric current, and the conducting power of the solution may be increased by adding to it a small quantity of sulphuric or nitric acid. A solution containing one pound of sulphate of copper in three and a half pints of water, and one third to one half of its volume of sulphuric acid, diluted with eight parts of water, forms a good working bath, especially when operating with non-conducting substances coated with plumbago.

The soluble electrode is always in copper; the mould may be formed of plumbago, carbon, gold, silver, platina, nickel, as well as of copper.

The discoverers of electrotyping are of opinion that it is always objectionable to employ an acid bath, yet many persons prefer it. The nitrate, chloride, and other soluble salts of copper present no advantages over the sulphate.

Silver Baths.—The choice of the silver salt to be employed depends upon the nature of the mould, which may be gold, platinum, silver, copper, carbon, or a plastic substance covered with one of these substances. Sulphate of silver answers very well for metals which have more affinity for oxygen than silver. Of all the salts that can be employed, the nitrate of silver is the least suitable. The following is the composition of the silver bath now generally adopted: Dissolve 2 lbs. of silver in 6 lbs. of nitric acid, and gently evaporate the solution over a spirit-lamp until the resulting nitrate is fused. By this means we drive off not only the excess of acid, but also reduce the copper that may be present. Then dissolve the nitrate in a gallon of water. Then, in another vessel, dissolve 4 lbs. of cyanide of potassium, and add the solution gradually to the silver solution; cyanide of silver is precipitated, and the nitrate of potassa formed remains in solution.

This operation, conducted with care, up to the moment when the addition of a small quantity of cyanide no longer causes a precipitate, admits of the removal of the nitrate of potassa in solution by decantation. The precipitate remaining in the vessel is washed in pure water, and immediately dissolved in 4 lbs. of cyanide of potassium. Then sufficient water is added to make up ten gallons. This bath is not immediately ready for use. Before it will yield a good deposit, it must be mixed with an equal quantity of an old bath; or, to impart to it the qualities of an old bath, it must be boiled for several hours; or, which is more to be depended upon, 2 lbs. of yellow prussiate of potash is added to every 4 lbs. of silver. But this last composition of the bath, although most generally employed, is not adapted for brilliant silvering.

Gold Baths.—Gilding may be done either hot or cold; the composition of the bath is the same in each case; only warm gilding is generally richer in color, and is usually adopted where the baths can be heated by steam.

The bath is formed of the double cyanide of gold and potassium, dissolved in an excess of potassium. To prepare it, dissolve 2 oz. of gold in aqua regia; evaporate it to a syrupy consistence; re-dissolve it in warm water, and add, little by little, 2 lbs. of cyanide of potassium, previously dissolved in water, and thus form 11 gallons of bath. It is best to boil it several hours before employing it. The most suitable temperature for operating is 160° Fahr.

ELECTROTYPING, Moulds for.—Every substance which is a conductor of electricity may be employed to form a mould suitable for the electrotyping process, provided that it is not liable to be acted upon by the solution, or to be reacted upon by the metal precipitated. A non-conducting mould fulfilling these conditions may also be employed, by taking the precaution of imparting a conducting faculty to its surface by means of a very thin coating of a conducting body, like plumbago, in a state of powder.

Metallic Moulds.—The conducting bodies capable of serving as moulds are—the metals, well-calcined carbon, and plumbago. The solution most commonly employed in electrotype operations is sulphate of copper, upon which zinc, tin and iron act. These three metals can not, therefore, be employed to make moulds, unless previously coppered in alkaline baths. Platina and gold perfectly unite all the required conditions; but their high price does not admit of their being employed on a large scale. These exceptions stated, there remain among the abundant metals only silver, copper, and lead, and the alloys of the latter metal, to form moulds. Silver, which can be precipitated only by gold and platinum, must be employed to reduce the metals when we wish the deposit precipitated to be of great purity. We obtain very excellent moulds of copper by means of an electro-chemical deposit of this metal upon the original subject, or upon a cast suitably metallized. Sheet-lead, when carefully cleaned of its oxide, is first flattened in a press between two iron plates. The object to be moulded is placed on the lead and covered with a steel plate, and passed through a rolling-press; the lead receives a perfect impression of even the most delicate parts. This is the method adopted in "nature printing." The alloys of lead employed are plumber's solder, type-metal, and fusible metal. Moulds in fusible metal are employed only in copying medals. The alloy most frequently employed consists of five parts lead, three parts tin, and three parts bismuth. It melts at 176° Fahr. With this alloy moulds are taken by percussion. Moulds are taken in plumber's solder by pouring the metal on a piece of paper, and laying this on a piece of cloth. The medal to be copied is laid upon the alloy, covered with a piece of wood, and struck a sharp blow. The mould must not be separated from the metal until the latter is quite cold. Success in this kind of moulding depends on the skill of the operator.

Non-conducting Moulds.—The plastic materials most commonly used are plaster of Paris, wax, stearine, paraffine, gelatine, sealing-wax, and gutta-percha.

Wax.—Plaster models are put into warm water until they are thoroughly saturated, but not so as to appear wet on the surface; the plaster is then put into a paper bag, and melted wax poured upon it. Left in a cool place, the

wax easily separates from the plaster; but as wax and similar substances contract materially upon cooling, it is necessary to employ a mixture of equal parts of yellow wax and resin. When melted and stirred together, the mixture is left to repose until all the bubbles have disappeared, and it has acquired the consistency of treacle. It is then poured over the model like wax.

Stearine.—Stearine may be employed in lieu of wax—or, still better, a mixture of thirty-two parts of spermaceti, seven of wax, and seven of mutton-fat, melted and strained. It is well to add a little plumbago to the mixture, to impart conductivity. Plaster moulds should be saturated with stearine. Sulphur moulds yield very fine impressions.

Gutta-percha.—This substance is admirably adapted for electrotyping operations. Sufficiently elastic to admit of the copying of undercut objects, and wholly unchangeable in acid and alkaline baths, it lasts almost indefinitely, if it be kept from the air. To prevent the spontaneous change of gutta-percha, it must be kept under water. When old, it becomes brittle. Its original properties may be restored by boiling it with a third of its weight of new gutta-percha.

There are two methods of obtaining a mould—by melting and by pressure.

The first method consists in putting into a stove, heated to 230 or 250° Fahr., the model and the sheet of gutta-percha, mixed with one third its weight of linseed-oil, so as to form a kind of fusion on the surface of the model; then, on removal from the stove, the gutta-percha is pressed down upon the model by the hand, moistened with cold water to prevent adherence, until a perfect mould may be supposed to be taken. When the gutta-percha is cold, it is separated from the model, and presents a perfect copy of all the details of the original. The principal objection to this method is that the gutta-percha undergoes great change, in consequence of which it will serve for only a small number of operations, and require a long time for each.

The second process, much preferable to the first, is by mechanical pressure. It requires a large quantity of material, but is a better and quicker process than that described above. On the platform of a screw-press a frame is placed, in which the *bed* upon which the model to be copied is laid. A lump of gutta-percha, softened in boiling water, and well kneaded in the hands, then a counterpart representing the principal sinuosities of the model, and horizontal on its upper surface, are laid upon the bed. In order to avoid the adherence of the model, it is gone over with a soft brush dipped in weak soap-water, and the lump of gutta-percha is dusted with plumbago. The gutta-percha, in yielding under the pressure, drives out the air and water before it, and impresses itself perfectly on the model. When cold, the mould is removed. Moulding in gutta-percha requires models in metal, which may be pressed or heated without fear of injury. If the model be of plaster or wax, we have recourse to modeling in

Gelatine.—This substance is more elastic than gutta-percha, and admits of objects more undercut being executed. It has the inconvenience of spoiling in acid baths, and of furnishing a very brittle metal, in consequence of the necessity that exists for making a very rapid deposit to avoid alteration in the surface of the mould.

Gelatine becomes nearly impermeable if we add to its solution in warm water 2 per cent. of tannic acid dissolved in alcohol, and 10 per cent. of treacle. But it still spoils in the baths if care be not taken to protect the external surface by a thin coating of gutta-percha or by a thick varnish. Dipping the gelatine mould into a strong solution of alum renders it of a horny texture, and less subject to be acted upon by the bath, but the mould contracts a little in consequence of this treatment.

Sealing-Wax.—Only the best quality of this material can be employed as moulds. It is usually applied to copy seals, by holding a card over the flame of a candle, and rubbing the surface in a circular direction with a stick of sealing-wax until sufficient thickness is obtained. Care must be taken that no air-bubbles exist. The seal or other object to be copied is then applied with strong pressure, and left till cold.

ELECTROTYPING, Metallization of the Moulds for.—Non-conductors of electricity require to be metallized in order to render them conductors. This is accomplished by two methods—the dry way and the wet way.

Plumbago.—Of all metallic or metallizing powders applied by the dry way, plumbago is the best. Its unctuous nature renders its application easy; by means of a soft brush, the plumbago may be applied to the most undercut portions of the mould. All kinds of plumbago are not equally good for metallization, and it is useful to make trial of their conductivity before adopting them.

The moist way consists in coating the surface of the mould with a metallic solution, and in reducing the metal it contains by the action of a gas, of a liquid, or of light. The most convenient solution is that of nitrate of silver in alcohol. It is applied to the mould with a fine pencil, and left to dry. Two or three successive applications are necessary; then the article is submitted to the action of nascent sulphureted hydrogen gas. Immediately the surface of the mould turns black the mould is ready for the bath, for the sulphureted silver has rendered the surface conducting. We may arrive at the same result by replacing the action of sulphureted hydrogen by that of phosphorus dissolved in sulphide of carbon, or by the direct action of solar light, or by gallic and pyrogallic acids, or by sulphate of iron in its minimum state of oxidation; but the first method is preferable. It is employed to metallize vegetable and animal matters, such as flowers, fruit, insects and osier and reed articles, so as to produce very curious results. The reduction of nitrate of silver by hydrogen permits, also, of the metallizing of silk threads, and consequently, of coppering, gilding, and silvering them. So, also, by metallization by the moist way, glass may be covered with metallic deposits, producing very remarkable artistic effects.

When the moulds are rendered conductors, a copper wire is attached to them, and they are put into the bath.

If the article be undercut, it is well to multiply the points of contact, so as to cause the deposits to fall upon several parts at once. The physical qualities of the copper obtained depend upon a perfect equilibrium between the four conditions which we have before described.

The thickness of the copper deposited upon a

given surface can not be perfectly uniform, in consequence of the galvanic current acting in an inverse ratio to the distance. The result is that the parts of the mould nearest to the anode receive most deposit, while the distant portions receive much less. There exist, therefore, very sensible differences in the thickness of the deposits, and, consequently, the electrotype deposit does not present all the solidity desirable.

To remedy this inconvenience, it has been proposed to solidify the interior of the galvanic shell, and take advantage of the different fusion points of copper and brass.

By means of the gas blow-pipe, wire or pieces of brass are melted into the copper shell, and perfectly unite with it, giving to the electro deposit the malleability and other qualities of an article that has been cast.

Metallic Powders.—Copper and silver are sometimes employed as metallic powders.

To obtain an extremely fine copper powder, the copper is precipitated from a boiling solution of its sulphate by metallic zinc; the copper is afterward separated from the zinc in excess by diluted sulphuric acid. The powder obtained is dried at a gentle heat.

Silver powder is prepared by boiling recently-prepared chloride of silver in water acidulated with sulphuric acid, and a piece of pure zinc.

The metallic powders are applied to the moulds—plaster impregnated with unctuous matters, etc.—after slightly warming them. A camel's or badger's-hair pencil is preferred for this purpose. The parts of the mould on which the metal is not to be deposited are coated with varnish.

Metals can be applied to glass without the interposition of a varnish. The object is submitted to the fumes of hydrofluoric acid, until the surface assumes a *mat* or ground-glass appearance. Plumbago is then applied with a cork or leather stump. An exceedingly thin coating of plumbago adheres to the rough surface with great force.

Cleaning.—The plastic moulds, when covered with a conducting coating by the preceding processes, are ready to be immersed in the baths. The metallic surfaces require to be first scoured and cleaned, either by chemical or mechanical means, which will be described hereafter.

ELECTROTYPING, Solders for.—To establish communication between the mould and the negative pole of the galvanic battery, a conductor is formed of a band of copper or of lead, which, if the mould is metallic, is soldered to the edges in the following manner:

Soldering with Chloride of Zinc and Tin.—The two surfaces to be united are scraped clean, and slightly moistened with a pencil dipped in hydrochlorate of zinc, and then are easily soldered with the soldering-iron and a little tin solder. After putting them closely in contact, the soldering is completed with the iron or the spirit-lamp.

Soldering with Stearine.—This process is simpler than the other. Stearine, generally at hand, is the only substance required to deoxidize the metals, and determine their adherence by the aid of tin solder.

The pieces to be cleaned are first scraped, and rubbed with sand-paper. The articles are then warmed at the flame of a spirit-lamp, and rubbed lightly with a piece of stearine. A very thin piece of solder is then applied to the heated part,

which immediately spreads, and combines intimately with the copper. The same operation is repeated upon the other piece to be soldered. The two articles are now held in close contact by a pair of pincers, and heated together, and they are left in the pincers until they are cold.

ELECTROTYPE PLATES, To Coat with Iron.—The following has been successfully employed in coating electrotype deposits with a coating of pure iron, thereby rendering them little inferior to steel-plate engravings as regards durability:

Dissolve 1 lb. of sal ammoniac in 1 gal. of rain-water, then add 2 lbs. of neutral acetate of iron; boil the solution in an iron-kettle for 2 hours, replacing the water lost by evaporation; when cold, filter the solution, and keep it in close-covered vats (when not in use) to prevent oxidation.

The iron plate used in the decomposition-cell must be of the same surface as the plate to be coated with iron; a Smee's battery, of at least 3 cells, charged with 1 part sulphuric acid, and 60 parts water, being used for the decomposition.

To insure success the following rules must be observed: 1st. The plate must be thoroughly freed from any greasy matter by immersing in a solution of caustic soda, then rinsed in clean cold rain-water, after which dip it in dilute acetic acid, and immediately transfer it to the solution of iron; this will insure perfect adhesion between the metals. 2d. The solution must be filtered previous to use to remove the oxide of iron formed by exposure to the atmosphere. After the plates have been coated with iron they must be well rinsed in clear warm rain-water, then in a weak alkaline solution, well dried with a piece of clean soft cotton, and slightly oiled to prevent oxidation.

The coating of iron is very hard and brittle, resembling the white iron used by manufacturers of malleable iron. Should any of the surface be damaged, the whole coating of iron may be removed by immersion in dilute sulphuric acid, and re-coated again by the above process.

ELECTROTYPING Plaster Casts.—To prepare a plaster cast for electrotyping, first dry the plaster cast in the oven thoroughly, then get equal parts of beeswax and common resin, melt them together, and boil the cast until it will not absorb any more; when cold, get some good black lead and cover the cast entirely, not thick but a bright surface, then you can electroplate in your battery as usual.

EMERY WHEELS.—Take a solid wheel, made of pine, or any other soft wood, and of the size required for his purpose. Turn the wheel true, and then turn rounds or hollows in its face, to suit the tools he wishes to grind, gouges, rounds, etc., mentioned by him. Then let him prepare some best glue, and, using it hot and thin, put it on the face of the wheel with a brush. The first coat of glue should be a light one, and when it is dry a second one should be applied, and as quickly as possible, as much emery should be sifted upon the wet surface as the glue will hold. When this is dry another coat of glue and emery should be applied in the same way. This will make a wheel that will last for months, and grind faster than anything else.

ENAMELS.—The beauty of the enamels is altogether dependent on the purity of their component parts, and great care is therefore required in the selection.

The presence of iron in the white ground mass is especially obnoxious, and for this reason crude soda is never used in its composition; but always a purified article. White enamel, prepared similarly to those given in our former article, is always the ground mass of enamels, and a coloring is produced by the addition of various oxides of metals. To affix enamels to metals, a ground mass of white is burned in under a muffle furnace first, and the colored enamel is afterward put on with a brush, and burned in at a second and less intense heating. The ground mass is required to be less fusible, and contains, therefore, less fluxing material than the colored enamels afterward added. Besides carbonate of soda, borax, and saltpetre, the silicate of lead is the principal flux used; but the latter must never be employed when a purple color is to be produced by oxide or chloride of gold, as the color would be destroyed during the heating.

The following composition, given by Dr. F. Stohmann, answers excellently for the ground mass, when purple, blue, and other tender colors are to be added subsequently: 3 parts of sand, 1 part of chalk, 3 parts of calcined borax; or 3 parts of glass free from lead, 1 part of calcined borax, $\frac{1}{4}$ part of nitrate of soda, and 1 part of antimoniate of potash. The latter composition is especially adapted for blue colors. The quantity of metal oxides depends entirely on the depth of the color which it is intended to produce.

The quantity of the above component parts can be varied within certain limits; but the principal quality requisite in a good enamel must never be lost sight of; that is, it must, when exposed to a low temperature, become sufficiently soft to show a glassy surface after cooling, and, at the same time, it must not become thinly fluid when smelted. This shows that it is by no means easy to hit always the exact proportions, and that great care is required in the business.

When a white opaque enamel is to be produced, it is especially important to use very pure materials. But if the mass, after smelting, shows a slight tinge only, the clear white can, in most cases, be restored by the addition of a little pyrolusite, which, however, must contain at least 90 to 95 per cent. of black oxide of manganese. If the common kinds, which often contain from 30 to 40 per cent. of peroxide of iron are used, they would spoil the color still more. An excess of pure black oxide of manganese is also injurious, as it would produce a violet color. The action of pyrolusite in producing a clear white is simply based on the fact that it gives off oxygen in the heat to organic matter which may be in the paste, and destroys it; and if small quantities of protoxide of iron are present they are oxidized to peroxide. Being itself reduced to the colorless suboxide, it is incorporated in the mass without imparting the violet color, so characteristic to its higher oxides. If a bluish white is desired, it can be easily imparted to the paste by adding a small excess of pyrolusite. A yellowish tinge may thus be completely covered.

To the original basis of white enamels, which has very nearly or entirely the composition of clear crystal glass, a certain proportion of a mixture of oxide of lead and tin, and often also sand, is added. The metal oxides are prepared by calcining the metals in the air. This is easily done, as at a certain temperature a proper mixture

of lead and tin burns like tinder. It is then only necessary to continually take off the skin of the oxides in order to expose new metal surface to the air. The whole mass is thus finally changed into a yellowish powder, which is best heated a second time until no more sparks issue from it. The second heating is performed in order to oxidize the small globules of metal which may have been scraped off the surface of the metal together with the oxides. The proportion of lead and tin taken varies greatly, from 15 to 40 parts being used to 100 parts of lead. Oxidation takes place the more readily, the more lead there is in the alloy.

A very fine white enamel is obtained by smelting one part of the oxides (made by calcining 2 parts of lead and 1 of tin) with 2 parts of finely pulverized crystal glass, and a small quantity of pyrolusite. When the mass has become entirely fluid, it is poured into cold water, and subsequently powdered to repeat the operation of smelting. This is often done three or four times, in order to produce an entirely homogeneous mass.

The purity of the white is principally dependent on the proportion of tin in the composition, a larger addition producing a more prominent white. The less sand there is used, the more fusible is the enamel, and *vice versa*.

Sometimes the antimoniate of potash or soda is used in the composition, but it must never be brought together with a glass containing lead, as a very inferior enamel would result. The usual composition of enamels, in which the antimoniate is present, is 3 parts of crystal glass to 1 part of antimoniate. It is mixed and smelted in the usual way.

For fine white enamels pure sand is usually not taken. A mixture of 1 part of sand, and $\frac{1}{4}$ part salt, which has been calcined, is melted with $\frac{1}{4}$ part oxide of lead; this mass is powdered and used instead of sand.

According to Clouet, a mixture of 60 parts of sand, 30 parts alum, 35 parts salt, and 100 parts of litharge produces a good white enamel, which resists a high temperature. It is desirable that the sand contain a small proportion of talc.

The most important manufacture in which enameling is used is that of the dials for clocks and watches. The proceeding is as follows: If the dials are large, both sides are covered with a coarsely pulverized mass of enamel, which has been previously prepared, and is only made into a pasty mass with a little water. This is allowed to dry gradually at a low heat, and then the whole is exposed to the heat of a muffle-furnace, until the enamel has become soft and glassy. It is taken out, and the small blisters which are usually found on the surface are ground down with fine sand. The dials are then brought back into the furnace, and once more heated until the enamel just commences to smelt on the surface. On taking them out and cooling them, it is found that the surfaces have the peculiar beautiful lustre which we see on dials. The circles are then drawn and divided into hours and minutes, by means of a machine; the marks are made with black enamel, which is mixed with a little lavender oil; and to burn in the black marks the dials are exposed to another slight heat. Small dials are enameled on one side only.

When jewelry or other ornaments are to be enameled on parts of their surfaces only, the

respective spots are first roughened, and an indentation is made either with a chisel or a stamp. These places are then filled with enamel, which is burned in.

Colored enamels are mostly spread on a white ground mass, which has been previously burned in, but sometimes they are put directly on the metal. In the latter case a comparatively low heat is employed in burning in the enamel.

The colors in enamels are produced by oxides of metals, as mentioned above. Their stability in the heat depends on the degree of the affinity which the metal has for the oxygen.

According to Dr. F. Stohmann, the different colors are prepared as follows:

Purple.—Oxide or chloride of gold is used to produce this color. Very little gold is sufficient to color a large quantity of enamel. As before mentioned, a paste must not be used for this enamel which contains lead or tin; it is customary to use one consisting of crystal glass, borax, and saltpetre, or of 3 parts quartz-sand, 1 part chalk, and 3 parts calcined borax. The purple color can not stand high temperatures.

Red.—We have no metal the oxide of which gives us directly a red color. It is therefore produced by adding to the paste of the enamel a mixture of peroxide of iron and clay, which is hard to fuse. But even in burning this in too high a heat must be avoided, in order to prevent the formation of silicate of peroxide of iron, which would destroy the color. The mixture is made by heating 2 to 2½ parts of copperas and 1 part of sulphate of alumina, first slowly, to drive out the water, then stronger, until the whole has assumed a red color. The right moment is seen by samples, which are from time to time taken out of the furnace, and allowed to cool, when the true color appears. The depth of the red color can be widely varied by altering the proportion of copperas and sulphate of alumina. Thus the proportion above given would produce a deep red, while 3 parts of sulphate of alumina and 1 part of copperas would make a flesh-color.

Yellow.—A good yellow color is made by mixing 1 part of oxide of antimony, 1 part of white-lead, 1 part of alum, and 1 of sal-ammonia. These substances are heated over a fire until the sal-ammonia has sublimated, and the whole has assumed a yellow color. With a small quantity of peroxide of iron, a yellow color can also be produced, if a high heat is used in burning the paste. This may consist of sand, oxide of lead, and borax for the antimony yellow, and of alum, oxide of lead, salt, and talcose sand, for the oxide of iron.

A good yellow may also be produced with the salts of silver. For this purpose a small quantity of oxide of silver, for instance, is put on the surface of the enamel, which has already been burned before, and a low heat is given. After cooling, metallic silver will be found coating the spot. On scraping this off, the enamel below will be found yellow.

Green.—This is produced by burning 2 ounces of oxide of copper or chrome with 4 ounces of paste. A small quantity of peroxide of iron is sometimes added.

Blue is always produced by oxide of cobalt. It is mixed with a paste which contains little or no lead, as this would deteriorate the color.

Black is produced by adding large quantities

of metal oxides with the paste, so that their color becomes so dark as to appear black. It can be done, for instance, by mixing pyrolusite, oxide of copper, and oxide of cobalt, or, according to Clouet, by mixing an easily fusible clay with a third of its weight of protoxide of iron.

Violet.—It has already been mentioned that this color is produced by black oxide of manganese. Care must be taken that no organic substances—as, for instance, coal-dust, smoke, etc.—come in contact with it in burning, as these destroy the color.

According to Armengaud's *Génie Industriel*, an enamel which is applicable to fine stone-work, metals, and fancy wood-work, is produced without the employment of heat, in the following manner:

1. By mixing mineral salts or oxides, which are capable of forming silicates with silica, in a solution of soda water-glass of syrup consistency, with a certain amount of silica.

2. By precipitating these silicates by means of a fixing medium, which consists of a salt, acting by double decomposition.

The artificially produce dsilicate of soda is dissolved in water, and the solution concentrated to the consistency of syrup; then the finely-pulverized mineral, mixed with finely-ground quartz, is added to the solution of water-glass, and by careful mixing and rubbing the whole, it is made into a homogeneous paste or thin dough.

This is spread on the object which it is to adorn, or to guard against the influence of the atmosphere. As soon as the mass has become dry, the fixing-medium, or reagent, which is a more or less clear solution of a salt by which the silicates are to be precipitated, is spread over it with a fine brush.

The precipitation takes place after some time: and when the covering substances have become entirely hard, the covered object attains a much greater durability. This is the case, because it has received an entirely new structure for a thickness of several millimeters from its surface, which now is much more perfectly coherent.

The coherence and different appearance of the surface can be varied in intensity, by—1. Giving a larger addition of silica, from $\frac{1}{2}$ to $\frac{3}{4}$ of the mass, if an enamel is desired which can resist a high temperature. 2. By augmenting the quantity of soda, or potash water-glass. This must be done to the higher a degree the easier fusible the product is intended to be.

ENAMELED Writing Surfaces.—A useful substance for making glass labels, sign boards, etc., is made as follows: 30 parts, by weight, of pure saltpetre, 90 parts of fine sand (silicic acid), and 250 parts of litharge, to be thoroughly blended, and then melted. The enamel made by these means can be written or drawn on with the same facility as the best paper; and has the novel, and, we may say, the unprecedented, capability, of perfect permanency, if the ink be properly prepared, as the writing can be burnt in, by means of a muffle, in less than a minute. Another advantage will help to recommend it to ingenious inventors: it can be treated, for photographic purposes, with a substitute for collodion. This substitute can be prepared as follows: 10 parts of gum, 1 part of honey, and 3 parts of bichromate of potash; filtered and dried on the surface of the above described preparation. The plate is exposed in the usual way. The development

is made by dusting, the powder being composed of 10 parts, by weight, of cobalt oxide, 90 parts of iron scales, 100 parts of red lead, and 30 parts of sand. When these components are mixed, the chromate should be decomposed by immersion in a bath of water, acidulated with 5 per cent. of muriatic acid. After washing and drying, the enamel should be melted on a piece of iron plate, coated with chalk; a minute's subjection to heat is enough, and the photograph on the enamel, perfectly glazed on, will be apparent.

ETCHING.—A species of engraving, in which the design is formed on the plate by the action of an acid, or some other fluid, instead of the graver.

The plate is covered with a ground or varnish capable of resisting the action of the etching fluid, the design is next scratched on the metal by means of a species of needle or pointed tool of steel. A border of wax is then placed round the plate, and the "biting" menstruum poured on, and allowed to remain till the lights or finest portion of the design is sufficiently "bit in." The etching fluid is then poured off, the plate washed, and the light parts "stopped up" with wax or varnish, when the solvent is again poured on, and allowed to remain until the finest portion of the exposed lines are sufficiently deep, when the acid is again poured off, and the whole process is repeated till the very darkest lines or shadows are sufficiently formed. The plate is then cleaned, and is printed from in the same way as a common engraved copper-plate. The most approved way of laying the design on the etching ground, is first to draw it with a black-lead pencil on paper, then to damp the paper, place it with the design next the wax or varnish, and to pass the whole through a rolling-press, by which means the picture will be transferred from the paper to the ground.

There are several varieties of etching, among which may be named *etching with a dry point*, performed entirely with the point, without any ground, the burr being removed with the scraper; *etching with a soft ground*, when a coating of lard or tallow is employed, and the design is drawn on a piece of paper, laid evenly on the ground, by which means the fatty matter adheres to the paper, on the parts pressed on by the pencil, and the copper beneath becomes exposed. This method is employed to produce imitations of chalk or pencil drawings. *Stippling*, or executing the design in dots instead of lines. *Aquatinta*, in which a weak spirituous solution of gum mastich is poured over the plate, placed in a slanting direction, by which a granulated surface is formed, and small interstices left, exposing the naked metal; a wall of wax is next placed round the margin of the plate, the etching fluid poured on, and the lighter parts successively "stopped out" until the design is completed. Aquatinta etchings bear a great resemblance to Indian ink drawings. The fineness or coarseness of the grain depends entirely upon the quantity of matter dissolved in the spirit employed to form the ground.

The fluids employed for "biting in" the designs vary considerably; almost every etcher having his own receipt. *Aqua fortis*, more or less diluted, is, however, generally employed for copper, and this, with the addition of pyroligneous acid, for etching on steel; but any fluid

that will rapidly dissolve the metal may be used for this purpose. The etching varnish or ground may be formed of any substance capable of resisting the action of the etching fluid, and, at the same time, sufficiently soft to allow of the free use of the needle or point, and sufficiently solid to prevent an injury to the design during the "scratching in."

In etching on glass, the ground is laid on, and the design scratched out in the usual way, when liquid hydrofluoric acid is applied, or the glass is exposed to the action of hydrofluoric acid gas. The former renders the surface of the etching transparent, the latter opaque. A very simple way of performing this operation is to wet the design with sulphuric acid, and then to sprinkle on some finely-pulverized fluor spar, (fluoride of calcium,) by which means hydrofluoric acid is set free and attacks the glass. This may be very easily applied to the graduation of glass vessels, thermometer tubes, etc.

A most rapid method of etching on iron or steel, capable of very general application, is as follows: Warm the metal until it is capable of melting a piece of beeswax, or etching varnish, which must then be carefully rubbed over it, so as to form a thin and even coating; allow the whole to cool, and scratch out the design in the common way, with a needle or point; then sprinkle on a little powdered iodine, and at the same time add a few drops of water with a camel-hair pencil, and work them into a liquid paste, which must be moved about over the intended engraving, for a period varying from one to five minutes, according to the depth of lines required to be produced. Afterwards wash the whole in clean water. Persons acquainted with the properties of iodine will readily perceive that the same etching-paste, by being kept for a few days, will again acquire the property of dissolving iron. I have thus successfully employed the same materials three or four times. Iodine will, doubtless, at no very distant period, supersede the use of acids for the above purpose, on account of its portability and convenience. To travelers and amateurs who amuse themselves with the delightful art of etching, it will, I think, prove invaluable.

ETCHING on Ivory.—Cover the ivory to be etched with a thin coating of beeswax, then trace the figure you desire to present through the wax. Pour over it a strong solution of nitrate of silver. Let remain a sufficient length of time, then remove it, with the wax, by washing in warm water. The design will be left in dark lines on the ivory.

FILES and RASPS.—Files and other instruments for the abrasion of various substances may be made by folding up separate pieces of wet clay in muslin, cambric, and Irish linen, forcing them by the pressure of the hand into the interstices of the threads, so that on divesting them of the covering, and having them well baked, a file is produced of a new species, said to be capable of operating on steel; and very useful in cutting glass, polishing, and rasping wood, ivory, and all sorts of metals.

FILES and RASPS, To Re-cut when Old.—Dissolve 4 oz. of saleratus in 1 quart of water, and boil the files in it for half an hour; then remove, wash, and dry them. Now have ready, in a glass or stone ware vessel, 1 quart of rain water, into which you have slowly added 4 oz. of

best sulphuric acid, and keep the proportions for any amount used. Immerse the files in this preparation for from six to twelve hours, according to fineness or coarseness of the file; then remove; wash them clean, dry quickly, and put a little sweet oil on them to cover the surface. If the files are coarse, they will need to remain in about twelve hours, but for fine files six to eight hours is sufficient. This plan is applicable to blacksmiths', gunsmiths', tinner's, copper-smiths' and machinists' files. Copper and tin workers will only require a short time to take the articles out of their files, as the soft metals with which they become filed are soon dissolved. Blacksmiths' and saw-mill files require full time. Files may be re-cut three times by this process. The liquid may be used at different times if required. Keep away from children, as it is poisonous.

FILES, To Clean.—Holding a file filled with work under a steam jet at 40 lbs. pressure is an effectual way of cleaning the same.

GALVANIZING Gray Iron Castings.—Cleanse the articles in an ordinary chafing mill, which consists of a barrel revolving on its axis; when the sand is all removed take them out and heat one by one, plunging while hot in a liquid composed as follows: 10 pounds of hydrochloric acid, sheet zinc, q. s. to make a saturated solution. In making this solution, when the evolution of gas has ceased, add muriate, or preferably sulphate of ammonia, 1 pound, and let it stand until dissolved. The castings should be so hot that when dipped into this solution, and instantly removed, they will immediately dry, leaving the surface crystallized like frost-work on a window pane. Next, plunge them while hot, but perfectly dry, into a bath of melted zinc, previously skimming the oxide on the surface away, and throwing thereon a small amount of powdered sal-ammoniac. If the articles are very small, inclose them in a wrought-iron basket on a pole, and lower them into the metal. When this is done, shake off the superfluous metal, and cast them into a vessel of water to prevent them from adhering together when the zinc upon the surface solidifies.

GILDING.—Gold is employed for gilding the surface of copper, brass and silver by the following different processes: 1. Hot gilding for the ornate, the bright French gold for ornaments of all kinds; the metal to be gilded is first washed with a solution of nitrate of mercury or amalgamating water, which gives a silvery surface; to this surface an amalgam of gold and mercury is applied, from which the mercury is driven off by heat. The color is then heightened by burning it on Calder's wax, formed of wax, verdigris and blue vitriol; it is then polished and brightened by a boiling solution of common salt and cream of tartar. Some adept heat the article on a hot iron plate provided with small apertures, and when heated apply some solution of iodine and yellow ochre with a brush. 2. German gilding of silver is performed by a solution of gold in nitric acid, to which sal-ammoniac and alembroth (a triple salt formed by salt and ammonia and corrosive sublimate) have been added. This solution of gold evaporates to the consistency of oil, and is then applied to the silver or nickel, both of which it blackens, but they appear gilded on being heated. 3. Gilding is also performed by rubbing the metal with the ashes of linen

rags which have been impregnated with a solution of gold. 4. Wet gilding by merely dipping the work in a solution of gold. 5. Gilding by the well-known process of electro-plating.

GILDING, Grecian.—Take sal-ammoniac and bichloride of mercury, equal parts, dissolve in nitric acid, and make a solution of gold with this fluid, lay it on the silver and expose it to a red heat; it will then be gilded.

GILDING Polished Metals.—1. Polished iron and steel may be readily gilded by applying an ethereal solution of gold to the surface with a camel-hair pencil. The ether flies off and leaves the surface coated with gold; it must then be polished with a burnisher. In this way, any fancy device or writing may be executed on steel or iron. This species of gilding is not, however, so durable as the following:—

2. Apply gold leaf to the surface of polished iron, steel, or copper, heated to a bluish tint, press it on gently with a burnisher, avoiding breaking or injuring the gold; again expose it to a gentle heat, and repeat the process with fresh leaves of gold, until the gilding has acquired a proper thickness; then let it cool and polish it with the burnisher.

GILDING Picture Frames.—The surface to be gilt must be carefully covered with a strong size, made by boiling down pieces of white leather, or clippings of parchment, till they are reduced to a strong jelly. This coating being dried eight or ten times, more size must be applied, the size being mixed with a small quantity of whitening. The last coating is composed of size and massicot, or sometimes yellow ochre. Let it dry thoroughly, and then damp the surface a little at a time with a damp sponge, and apply the gold leaf before this dries. It will immediately adhere, and when dry, those parts which are to be brilliant are to be burnished with an agate or dog's-tooth burnisher.

GILDING and SILVERING, To Test the Genuineness of.—A solution of chloride of copper is the test for gilding. When the object is only covered with the usual gold-colored alloy, this reagent produces a black spot, which is not seen if the gilding has been done with gold.

Equal parts of bichromate of potash and nitric acid, brought in contact with real silver, will form a red spot, while alloys imitating silver show divers other peculiar colors, or no change whatever.

GILT ORNAMENTS, To Clean.—The best way to prevent gold and gilt ornaments from tarnishing, and to make them bright, is to keep them in box-wood sawdust, which may be obtained at any ivory turner's. To clean them, wash in a lather with a soft brush, rinse, and let them drain on a cloth. When nearly dry, put them into the box-wood sawdust.

GLASS GLOBES, To Silver.—Take equal parts of tin and lead, and melt them together; add while they are in fusion two parts of bismuth and two parts of mercury. Take from the fire, and so soon as cool enough for the glass to bear it, pour into the globe and move slowly so that the amalgam will pass over every part of its interior. A thin film will be left at every point of contact.

GOLD, Artificial.—An American has discovered a beautiful alloy, which has been most successfully applied as a substitute for gold; it is composed of pure copper, 100 parts; pure tin,

17 parts; magnesia, 6 parts; tartar of commerce, 9 parts; sal ammoniac, 3·6 parts; and quicklime, 1·6 part. The copper is first melted, then the lime, magnesia, sal ammoniac, and tartar are added, little at a time, and the whole is briskly stirred for about half an hour, so as to mix thoroughly, after which the tin is thrown on the surface in small grains, stirring until entirely fused. The crucible is now covered, and the fusion kept up for about thirty-five minutes, when the dross is skimmed off, and the alloy found ready for use. It is quite malleable and ductile, and may be drawn, stamped, chased, beaten into powder, or into leaves, like gold leaf. In all of which conditions it is not distinguishable from gold even by good judges, except by its inferior weight.

GOLD ARTICLES, Polishing Powder for.—Dr. W. Hofmann has analyzed a polishing powder sold by gold workers in Germany, which always commands a very high price, and hence, it may be inferred, is well adapted for the purpose. He found it to be a very simple composition, being a mixture of about 70 per cent. of sesquioxide of iron and 30 per cent. of sal-ammoniac. To prepare it, protochloride of iron, prepared by dissolving iron in hydrochloric acid, is treated with liquid ammonia until a precipitate is no longer formed. The precipitate is collected on a filter, and without washing, is dried at such a temperature that the adhering sal-ammoniac shall not be volatilized. The peroxide of iron precipitate at first becomes charged with sesquioxide.

GOLD, To make of Four Carats.—Four carat gold is used to a considerable extent for cheap rings, pin-tongues and the like. It is a very nice metal, wears well, does not black the finger, and presents somewhat the appearance of Guinea gold. You make it by melting together eighteen parts copper, four parts gold, and two parts silver.

GOLD, To make of Twelve Carats.—Melt together, in the usual way, twenty-five grains gold—if coin—thirteen and a half grains copper, and seven and a third grains silver. This is a very good gold for rings, etc.—stands acids almost equal to the higher grades, and looks fully as well. Of course it is deficient in weight.

GOLD, To make of Sixteen Carats.—Compound sixteen grains pure gold with five and a half grains pure copper and two and a half grains pure silver. Or, if gold coin is used, seventeen grains gold, five grains copper and two grains silver.

GOLD, To make of Eighteen Carats.—To make the eighteen carat gold, generally in use, melt together as above, eighteen grains pure gold, four grains pure copper and two grains pure silver. In cases where you find it necessary to use gold coin, weigh out in the proportion of nineteen and a half grains gold, three grains copper and one and a half grains silver.

GOLD COIN, To make.—The gold of American and English coin is twenty-two carat fine. Copper alone usually forms the alloy, though a portion of silver is sometimes added. To make coin gold, you melt together with saltpetre and sal-ammoniac, the two metals in the proportion of twenty-two grains pure gold and two grains pure copper. When silver forms a part of the alloy it is usually about one-third silver to two-thirds copper.

GOLD, Counterfeit.—Fuse together with

saltpetre, sal-ammoniac and powdered charcoal, four parts platina, two and a half parts pure copper, one part pure zinc, two parts block tin and one and a half parts pure lead.

Another good recipe calls for two parts platina, one part silver and three parts copper.

A metal compounded in accordance with either formula, as exhibited above, will so nearly resemble gold as to almost defy detection without a resort to thorough tests. The platina requires a high temperature to melt, but nothing could be substituted that would act so well, as it adds to the ring of the metal, and to a great extent fortifies it against the action of acids.

If at any time you should find your metal too hard or brittle for practical use re-melt it with sal-ammoniac. It may in some cases be necessary to repeat this operation several times, but it will be sure to produce the desired effect eventually.

GOLD, Coloring.—Gold is colored by two processes, called the dry and wet color; but the materials used in both cases are the same. They are as follows:—One part salt, one part alum, and two parts saltpetre; each material to be pounded separately in a mortar, taking care they are perfectly clean (this is the dry process). After being well pounded they are put into an iron color-pot and slowly heated over a fire. The color must boil gradually, and must be stirred with an iron rod. It will then rise, and then it is ready for the reception of the articles to be colored, which must be not less than 18 carat. They are suspended in the color by 18 carat wire, and kept in motion till the liquid begins to sink, then they are taken out and dipped in aquafortis pickle. The color will rise again, and then another dip, and sometimes two, is necessary to give them the proper color. The wet color process is a much inferior method, except for gold of lower standard, and then not below 15 carat, as the alloy would suffer so seriously from the coloring. The fact is, coloring is no more than taking from the surface the inferior metals, leaving a thin coating of pure gold.

GOLD CHAIN, To Clean.—Put it in a small glass bottle, with warm soapsuds and a little prepared chalk; shake it well, rinse in clear, cold water, and wipe on a towel.

GOLD, To Clean.—Powder some whiting, and make it into a moist paste with some sal volatile. Cover over the gold ornaments and surface with a soft brush, let it dry, and then brush it off with a moderately hard brush.

GOLD AMALGAM, To Make.—Eight parts of gold and one of mercury are formed into an amalgam for plating by rendering the gold into thin plates, making it red hot and then putting it into the mercury while the latter is also heated to ebullition. The gold immediately disappears in combination with the mercury, after which the mixture may be turned into water to cool. It is then ready for use.

GOLD AMALGAM, To Plate with.—Gold amalgam is chiefly used as a plating for silver, copper or brass. The article to be plated is washed over with diluted nitric acid or potash lye and prepared chalk, to remove any tarnish or rust that might prevent the amalgam from adhering. After having been polished perfectly bright the amalgam is applied as evenly as possible, usually with a fine scratch brush. It is then set upon a grate over a charcoal fire, or placed into an oven and heated to that degree at

which mercury exhales. The gold, when the mercury has evaporated, presents a dull yellow color. Cover it with a coating of pulverized nitre and alum in equal parts, mixed to a paste with water, and heat again till it is thoroughly melted, then plunge into water. Burnish up with a steel or bloodstone burnisher.

GOLD, To separate from Gilt Copper or Silver.—Take a solution of borax in water, apply to the gilt surface, and sprinkle over it some finely powdered sulphur, make the article red-hot and quench it in water, then scrape off the gold and recover it by means of lead.

GOLD or SILVER, To Enamel.—Take half a pennyweight of silver, two pennyweights and a half of copper, three pennyweights and a half of lead and two pennyweights and a half of muriate of ammonia. Melt together and pour into a crucible with twice as much pulverized sulphur; the crucible is then to be immediately covered that the sulphur may not take fire, and the mixture is to be calcined over a smelting fire until the superfluous sulphur is burned away. The compound is then to be coarsely pounded, and with a solution of muriate of ammonia to be formed into a paste, which is to be placed upon the article it is designed to enamel. The article must then be held over a spirit lamp till the compound upon it melts and flows. After this it may be smoothed and polished up in safety. This makes the black enamel now so much used on jewelry.

GOLD, French.—Spanish copper 6 parts, silver 3 parts; gold 5 parts. Mix.

GOLD (Green), To Make.—Melt together nineteen grains pure gold and five grains pure silver. The metal thus prepared has a beautiful green shade. Some years ago it was used pretty extensively by jewelers in the formation of leaves, but we do not meet with it so often now.

GOLD (Green), To Heighten the Color of.—Take of saltpetre, 1 oz. 10 dwts.; sal ammoniac, 1 oz. 4 dwts.; Roman vitriol, 1 oz. 4 dwts.; verdigris, 18 dwts. Mix them well together and dissolve a portion in water, as occasion requires.

The work must be dipped in these compositions, applied to a proper heat to burn them off, and then quenched in water or vinegar.

GOLD, To Gild with upon Silver.—Beat a ducat thin, and dissolve it in two ounces of aqua regia; dip clean rags in it and let them dry; burn the rags, and, with the tinder thereof, rub the silver with a little spittle; be sure first that the silver be cleansed from grease.

GOLD, Imitation.—1. Four ounces platina, three ounces silver, one ounce copper.

2. To 100 parts copper, melt with six parts magnesia, three and one-half parts sal ammonia, one eighth parts quicklime, and nine parts cream tartar, and, when fusing for some time, add 17 parts zinc, and stir it quickly.

3. Sixteen parts copper, seven parts platina; melt with borax and charcoal and one part zinc added.

4. Platinum, 16 parts; copper, 7 parts; zinc, 1 part; put in a crucible, cover with charcoal powder, and melt into a mass.

GOLD LAQUER.—Gold Laquer is made by dissolving gum shellac in alcohol, and coloring it with turmeric or gamboge. It is strained through a cloth before it is used, and generally takes several days to macerate.

GOLD, Mosaic.—Copper and zinc, equal

parts. Fuse at the lowest possible temperature, and stir well to produce a perfect admixture, then add more zinc until the fused alloy becomes perfectly white; lastly, pour it into moulds. The proportion of zinc to the copper is from 50 to 55 per cent., exclusive of what is lost by the heat employed.

GOLD, Oreide.—The best article is made by compounding four parts pure copper, one and three-fourth parts pure zinc, one-fourth part magnesia, one-tenth part sal-ammoniac, one-twelfth part quicklime, and one part cream tartar. Melt the copper first, then add as rapidly as possible the other articles in the order named.

GOLD POWDER.—Put some gold-leaf, with a little honey, or thick gum-water made with gum-arabic, into an earthen mortar, and pound the mixture till the gold is reduced to very small particles; then wash out the honey or gum repeatedly with warm water, and the gold in powder will be left behind. When dry, it is fit for use.

GOLD (Dutch) Powder.—This is made from Dutch gold-leaf, which is sold in books at a very low price. Treat in the manner described above for true gold-powder. When this inferior powder is used, cover the gilding with a coat of clear varnish, otherwise it will soon lose its bright appearance.

GOLD (Mosaic) Powder for Bronzing, &c.—Melt 1 lb. tin in a crucible, add $\frac{1}{2}$ lb. of purified quicksilver to it; when this is cold, it is reduced to powder, and ground, with $\frac{1}{2}$ lb. sal-ammoniac and 7 oz. flour of sulphur, till the whole is thoroughly mixed. They are then calcined in a matrass; and the sublimation of the other ingredients leaves the tin converted into the mosaic gold-powder which is found at the bottom of the glass. Remove any black or discolored particles. The sal-ammoniac used must be very white and clear, and the mercury of the utmost purity. When a deeper red is required, grind a very small quantity of red-lead with the above materials.

GOLD PLATING SOLUTION, To Make and Apply.—Dissolve half an ounce of gold amalgam in one ounce of nitro-muriatic acid. Add two ounces of alcohol, and then, having brightened the article in the usual way, apply the solution with a soft brush. Rinse and dry in saw-dust, or with tissue paper, and polish up with chamois skin.

GOLD, To Refine.—If you desire to refine your gold from the baser metals, swedge or roll it out very thin, then cut into narrow strips and curl up so as to prevent its lying flatly. Drop the pieces thus prepared into a vessel containing good nitric acid, in the proportion of acid two ounces, and pure rain water half an ounce. Suffer to remain until thoroughly dissolved, which will be the case in from half an hour to one hour. Then pour off the liquid carefully and you will find the gold in the form of a yellow powder lying at the bottom of the vessel. Wash this with pure water till it ceases to have an acid taste, after which you may melt and cast into any form you choose. Gold treated in this way may be relied on as perfectly pure.

In melting gold use none other than a charcoal fire, and during the process sprinkle saltpetre and potash into the crucible occasionally. Do not attempt to melt with stone coal, as it renders the metal brittle and otherwise imperfect.

GOLD, Recovering.—Gold may be stripped from articles that have been gilt by placing them in strong nitric acid, in which some salt has been previously dissolved. When a number of articles have been stripped in the solution, it begins to work slowly, and it is time then to abandon it, and use a new one. The gold may then be recovered from the old solution, by evaporating it to dryness, and fusing the residuum with a small piece of soda or potash, the gold being fused into a button. The addition of a little saltpetre will tend to make the refining process more complete. As there is some trouble connected with this process, it is scarcely worth adopting where very small quantities of gold are concerned. In such a case it is a better plan to suspend the article, from which the gold is to be removed, in the gilding bath in the place of the anode when gilding another article.

GOLD (Red), To Highten the Color of.—To 4 oz. of melted yellow wax, add, in fine powder, $1\frac{1}{2}$ oz. of red ochre, $1\frac{1}{2}$ oz. of verdigris, calcined till it yield no fumes, and $\frac{1}{2}$ oz. of calcined borax; mix them well together. It is necessary to calcine the verdigris, or else by the heat applied in burning the wax, the vinegar becomes so concentrated as to corrode the surface, and make it appear speckled.

GOLD SOLDER.—Melt together in a charcoal fire twenty-four grains gold coin, nine grains pure silver, six grains copper and three grains good brass. This makes a solder for gold ranging from twelve to sixteen carats in fineness. Where a finer grade is to be worked, the solder may be made to correspond by increasing the proportion of gold in its composition. A darker solder may be made, if desired, by lessening the proportion of silver, and increasing that of the copper in a corresponding degree.

GOLD TARNISHED IN SOLDERING, To Clean.—The old English mode was to expose all parts of the article to a uniform heat, allow it to cool and then boil until bright in urine and sal-ammoniac. It is now usually cleansed with diluted sulphuric acid. The pickle is made in about the proportion of one-eighth of an ounce acid to one ounce rain water.

GOLD and SILVER, A New Process of Separating.—Instead of precipitating the sulphate of silver, which results from the refining of gold by sulphuric acid, by copper, it is reduced, at the works of the San Francisco Assaying and Refining Co., by protosulphate of iron. The hot, thick, turbid mass, which is obtained by treating the bullion with sulphuric acid in cast-iron pots, is placed into a cast-iron vessel containing sulphuric acid of 58° B. heated to about 110° C. A very small quantity of water is then added, and after a few minutes the now clear solution is drawn into a second vessel, which can be cooled from the outside. By the addition of the water all the sulphate of lead is precipitated, which carries down all impurities, and all the suspended gold. As soon as the solution in the lower vessel is cooled to from 30° to 40° C., the mother liquor is pumped back into the upper vessel, where it is again heated and treated as before with acid of 58° B. The sulphate of silver is found in hard yellow crystals in a layer one or two inches thick, containing but very little free acid. The crystals are put on the false bottom of a box lined with lead, which is provided with wheels and an opening for letting off the liquor.

These crystals are mixed with a red powder, essentially sulphate of copper. A hot aqueous solution of sulphate of copper is allowed to run through them. The copper salt is dissolved first, and collected in a separate vessel to be worked for sulphate of copper. As soon as the filtrate shows the pure brown color of the sesquisulphate of iron, it runs into another vessel, where on cooling the greater part of the dissolved silver salt is decomposed, and metallic silver precipitated, which is added to the principal mass on the filter. Here the crystals have been converted into a dense coherent mass of metallic silver, which may be considered as completely reduced as soon as the iron solution, filtering through, shows a pure green color. It is washed with water, pressed, and melted. The oxidized iron solution is collected in a lead lined vessel, which contains iron scraps. It is thereby converted into a solution of protosulphate, and used again. The small quantity of silver and copper, which is precipitated by the iron scraps, is from time to time added to the crystals on the filter where the copper is rapidly dissolved. One hundred pounds of silver, reduced on the filter, require about 20 cubic feet of solution of protosulphate of iron.

GOLD, Test for.—In order to ascertain whether an article is made of gold, if a doubt arises a simple plan is to rub a portion of the article upon a piece of slate, wedgewood ware or oil stone (dry), and then apply a single drop of nitric acid by touching the part with the stopper of the bottle. If the acid produces no effect the article may be considered gold. A very inferior alloy of gold, however (twelve carat gold), will stand this test; but its color will act as a guide, as it will fail (except when electro-gilt) to present the rich yellow color of good gold. When a common gold article has been strongly gilt, it will be advisable to pass a keen but smooth file over a small part of the article, and then apply the nitric acid to the part, when, if the article is not genuine, the characteristic green tint of nitrate of copper will at once show itself.

GOLD (Yellow), To Highten the Color of.—Take of saltpetre, 6 oz.; green copperas, 2 oz.; white vitriol and alum, of each, 1 oz.

If it be wanted redder, a small portion of blue vitriol must be added. These are to be well mixed, and dissolved in water as the color is wanted.

GONGS, Chinese.—It is said they are of an alloy consisting of 78 per cent. of copper and 22 of zinc. The operation of making them chiefly consists in a well-managed beating out and annealing of the disc.

GUN-BARRELS, Browning for.—Spirits of nitre 1 lb.; alcohol 1 lb.; corrosive sublimate 1 oz.; mix in a bottle and keep corked for use. Plug both ends of the barrel, and let the plugs stick out three or four inches, to handle by, and also to prevent the fluid from entering the barrel, causing it to rust; polish the barrel perfectly; then rub it well with quicklime by means of a cloth, which removes oil or grease; now apply the browning fluid with a clean white cloth, apply one coat and set in a warm, dark place, until a red rust is formed over the whole surface, which will require, in warm weather, from ten to twelve hours, and in cold weather, from fifteen to twenty hours, or until the rust becomes red; then card it.

gun-maker's card and

rub off with a clean cloth; repeat the process until the color suits, as each coat gives a darker shade.

GUN-BARRELS (*Twist*), *Browning for*.—Take spirits of nitre $\frac{3}{4}$ oz.; tincture of steel $\frac{3}{4}$ oz.; (if the tincture of steel cannot be obtained, the unmedicated tincture of iron may be used, but it is not so good) black brimstone $\frac{3}{4}$ oz.; blue vitriol $\frac{1}{2}$ oz.; corrosive sublimate $\frac{1}{4}$ oz.; nitric acid 1 dr. or 60 drops; copperas $\frac{1}{4}$ oz.; mix with $1\frac{1}{2}$ pts. of rain water, keep corked, also, as the other, and the process of applying is also the same.

GUN METAL.—1. Melt together 112 lbs. of Bristol brass, 14 lbs. of spelter, and 7 lbs. of block tin.—2. Melt together 9 parts of copper and 1 part of tin; the above compounds are those used in the manufacture of small and great brass guns, swivels, etc.

HAIR-SPRING of Watch, *To weaken*.—This is often effected by grinding the spring down. You remove the spring from the collet, and place it upon a piece of pivot wood cut to fit the centre coil. A piece of soft steel wire, flattened so as to pass freely between the coils, and armed with a little pulverized oil-stone and oil, will serve as your grinder, and with it you may soon reduce the strength of the spring. Your operations will, of course, be confined to the centre coil, for no other part of the spring will rest sufficiently against the wood to enable you to grind it, but this will generally suffice. The effect will be more rapid than one would suppose, therefore it will stand you in hand to be careful or you may get the spring too weak before you suspect it.

Another and perhaps later process is as follows: Fit the collet, without removing the spring, upon a stick of pivot wood, and having prepared a little diluted nitric acid in a watch-glass, plunge the centre coils into it, keeping the other parts of the spring from contact by holding it in the shape of an inverted hoop skirt, with your tweezers. Expose it a few seconds, governing the time of course by the degree of effect desired, and then rinse off, first with clean water, and afterwards with alcohol. Dry in the sun or with tissue paper.

HARDENING Mill-Picks and Cast-Steel in General.—The hardening of cast-steel in general is a process well known to every smith and forgerman and to the mechanic, in so far as it regards turning-tools, chisel, hammers, and other tools which he has constantly to use. But it frequently happens that the same chisel, after being apparently well hardened, has assumed quite another degree than it had at first. It is, therefore, not surprising that the workman, after having struck the right degree, takes care of his tool in every conceivable manner. Even workmen that are exclusively occupied with hardening can only guarantee five good pieces out of ten. One thinks he has obtained a uniform degree, by testing with the file, but use soon proves that the degree varies in the different pieces. The one bends, the other breaks; and yet they are all made out of one and the same material, and have passed through the same operation. Let us first see what qualities are best adapted for the respective instruments. For mill-picks, especially when they are to be used for re-dressing French stones, only the very best English tool-steel should be selected. The commercial English cast-steel, so called, is, although it is directly

imported and bears the stamp "Huntsman," only mild cast-steel, or at least an inferior kind of tool-steel.

Unfortunately for the artisan, common welding-steel is sold sometimes for tool-steel. Both kinds consist of cast-steel, but they are unequal in quality. The steel sold under the term *Fuss-stahl* (foot-steel)—so called because it only occurs in lengths of one foot—although only one fourth of an inch thick, is really excellent tool-steel. Yet, in order to get only this brand, and no other, one has to get it directly from the manufacturer, who, by the way, should be informed for what purpose it is intended.

The second reason why the hardness is not always found to be a uniform one, is to be attributed to forging. In forging, it is scarcely to be avoided that one piece gets warmer than another, since it is not well possible to measure the heat during this operation. The warmer the steel, the more does its texture become changed and the more the molecules separate from each other. It is also observable that an inferior piece of cast-steel tears and cracks if forged too cold.

Mill-picks should be forged in the following manner: The steel must be slowly heated in the charcoal fire till it assumes a bright red color. If a part gets yellow or white, it should be cut off, and used for some other purpose. A mill-pick must be beaten out on one side in one heat; when the steel commences to cool off, cold water must be poured upon the anvil, and the hammer also must be dipped into cold water. The blows should be light, quick, and frequent, and the water must be renewed at the same time, until the iron is perfectly cool. By this procedure it will acquire a very dense structure. Should cracks present themselves, the fissured piece is to be cut off. The steel may then be filed or ground until as thin as desired. This method being applied by a very few smiths only, comparatively speaking, the stone-dresser himself will have to watch the operations of the smith.

All the vaunted nostrums for hardening fail to give satisfaction for the purpose in question.

The process of hardening proper is practiced as follows for ordinary tools: The tool after being heated to the desired length, is immersed in water for only a short time; it is then withdrawn and polished with pumice-stone, so that the annealing colors may be recognized. If it possesses the desired color, the whole piece is at once immersed in the trough. This process, indeed, suffices very well for the tools of iron workers; but not so for tools that are to be possessed of a high and perfectly uniform degree of hardness, as is the case with millers' tools. If they are forged as described above, and then properly prepared by grinding or filing, the hardening may be proceeded with. No one, in the first place, should endeavor to heat the pieces in the smith's hearth. This process should be accomplished by setting four bricks upon a solid support, filling the interior with charcoal, that is kindled and fanned until well glowing. The picks are then stuck in and left to themselves, *without further fanning*. When they have assumed the color of the fuel, the time has arrived when they may be dipped into the water.

The water should not be calcareous, or if it is so, a little soap or soda should be added to it in order to neutralize the lime. Its temperature

also must not be low, about 65° being the most suitable.

After being withdrawn, the objects, of which it is said that they are "hard as glass," must be "let down." To this end a sufficiently strong piece of iron is brought to a red heat; the respective tools are then laid upon it, and the time is waited for when the desired tempering-color appears. It should be near *sulphur yellow* for mill-picks; *orange* for cutting-tools on metal; *violet* for wood-cutting tools; and *dark blue* to *light blue* for hard chisels to be used on metal.

When the desired color has made its appearance, the tools are repeatedly coated with a fat oil, (olive or rape-seed oil, not petroleum,) whereupon they are allowed to cool. For the different brands of one and the same kind of steel, the proper color can only be found out by experiments. In hardening files, it is beneficial to stir in the water some acid, which purifies them from the adhering film of oxide. Upon fine, polished objects common washing-soap may be spread. For steel that readily acquires fissures the following procedure is to be recommended: Finely ground chalk is mixed with oil to a thick paste, and with this the piece is brushed over. Then it is hardened, as above described. If such a tool is tested with the file after hardening, it is apparently very soft; however, this softness is only limited to the depth of a thin crust, that has been formed by the mixture. When the latter is cleaned off, the tool will appear perfectly hard. All these remarks refer to tool-steel and welding-steel.

A few words may be added on the hardening of pivots and counter-sinks. In withdrawing pivots from the water they sometimes break instantaneously, sometimes after a short while. In order to obviate this, wrought-iron rings must be drawn on their heads. The diameter of the ring should exceed that of the pivots by one eighth of an inch. They are to be heated slowly and with caution, in order that they may get uniformly hot. When they have attained the proper degree of heat, finely powdered yellow prussiate of potassa is spread over them, the cylinders being turned constantly so that the flux may flow around them. However, before this substance ceases to flow, the pivots must be withdrawn from the fire and immersed vertically into the cooling-trough. The water must be of the same temperature and nature as above prescribed. The tools have to remain in the water from one to six days, according to their dimensions. If prematurely withdrawn, they often break. Pivots that are to remain soft, so that they may be turned, should be well covered with a mixture of clay and calf's hair. But, though these precautions may have been observed, breakages are still within the range of possibility. It has, for instance, happened to the writer, though but once, that a cylinder broke after having been ready for four weeks.

Springs and counter-sinks are cooled in oil, of which there must be a sufficient quantity so that it may not get too hot.

Springs are annealed by heating them upon a hot iron until a pigeon's wing will singe, or at least become yellow, when held at some distance over it, when they are allowed to cool.

In conclusion, it may not be superfluous to remark that it is in hardening as in most other branches of the arts and manufactures; the work-

man, however well instructed in theories and rules, must study closely the behavior of his material, and watch his process well—in short, use his own judgment.

HOLES IN IRON, Chinese Method of Mending.—The Chinese mend holes in cast-iron vessels as follows: They melt a small quantity of iron in a crucible the size of a thimble, and pour the molten metal on a piece of felt covered with wood-ashes. This is pressed inside the vessel against the hole, and as it exudes on the other side it is struck by a small roll of felt covered with ashes. The new iron then adheres to the old.

HORSE-POWER of Steam-Engines and Boilers, To Ascertain.—The Franklin Institute, in Philadelphia, referred this subject to a committee, which has quite recently delivered a report, which from its useful contents we think will prove of interest. It is as follows:

In a thorough examination of this question, it is necessary first to advert to the origin of the term horse-power, and the manner in which it was first used to designate the power of the steam-engine. The early demand for the steam-engine was to effect some task before performed by horses, and it became a question of comparison of the new mechanical with the animal motor.

From experiments made to determine the actual power exerted by good average horses, it has been found that a horse, working for eight hours per day, will exert a force equal to about 23,400 pounds, and when working for three hours only, will exert as much as 32,900 pounds, raised one foot high per minute. The example taken as a unit by James Watt was that given by the heavy dray-horses of the brewers of London, whose maximum performance in hauling was found to be 150 pounds at two and a half miles per hour; equal to 33,000 pounds lifted one foot high in a minute. This has since remained the standard for a horse-power, both in English, Continental, and American practice.

This unit of power exerted upon the piston of the steam-engine, measured by the instrument known as an indicator, is termed the indicated horse-power; and the power given out by the engine to the machinery is the actual or effective horse-power, being the indicated power minus the friction of the engine. There is also the nominal power, a term based upon the size of the cylinder and an arbitrarily assumed speed of piston and pressure of steam. This might also be termed the commercial power of the engine. Watt, in the construction of steam-engines after the type established by him, adopted for the speed of the piston 128 times the cube root of the stroke in feet; and assumed seven pounds as the effective pressure upon the piston. He thus obtained a nominal horse-power, which, under the most unfavorable circumstances, his engines were sure to produce.

Then, again, we have the rule of the British admiralty for marine-engines, in which the old assumed pressure of seven pounds is adhered to, but the actual speed of the piston is taken into account. Another rule for the nominal power of high-pressure engines has the authority of Bourne, who assumes the speed of the piston to be that given by Watt, and the effective pressure on the piston to be three times as great, that is, twenty-one pounds per square inch. His rule is to multiply the square of the diameter of the

cylinder in inches by the cube root of the stroke in feet, and divide the product by 15 $\frac{3}{4}$. Thus we find a great diversity in the rules for estimating the nominal power of engines. This nominal power, the power at which the engine is rated by the maker, has gradually become greater as the speed and pressure have been increased. But, in all cases, the nominal power is much less than the actual power at which such engine is capable of working, with the average pressure and speed common to engines of that class.

Going back to the historical era of the use of steam, the committee find that, at an early day, although subsequent to Watt's time, the evaporation of a cubic foot of water per hour, from and at the temperature of 212°, was ruled to be the measure of a nominal horse-power. All subsequent authorities, without exception, have adopted this standard. In the steam-boiler they make no distinction between the nominal and the actual horse-power. There is only one definition of the term, and that is the evaporation of a cubic foot of water, as previously stated. It is with this definition that we use the term horse-power. This rule appears yet to be applicable, and it only needs some statements of conditions such as will allow purchasers and sellers to conform to this requirement.

For stationary boilers, with natural draught, assuming that the chimneys and flues shall be adequate, in size and form, to afford the necessary draught, and that the fuel is coal of average good quality, it appears that nearly all writers give about 55-100 square feet of grate to each horse-power of boilers; and as this ratio gives a very small grate for the lesser number of horse-power, about two feet are added as a constant.

Having thus designated the means for burning the fuel, the conditions attached to the horse-power of boilers are within some limit as to quantity of fuel to be used in producing this effect. In other words, the arrangement and extent of heating-surface should be such that at least the average result by evaporation of nine pounds of water from and at 212° with one pound of good anthracite coal burned (over and above ashes) shall be attained. As there are 59.48 pounds of water at 212° in a cubic foot, it follows that 6.61 pounds of coal will be needed for its evaporation. Adopting the more convenient number of seven pounds as a liberal allowance, the rule would be 7 H. P. divided by 0.55 H. P.

2, equal to the number of pounds burned per hour per square foot of grate; or for boilers of

10 h. p., 7 $\frac{1}{2}$ square feet of grate, 9.33 pounds per hour per square foot of grate.

20 h. p., 13 square feet of grate, 10.76 pounds per hour per square foot of grate.

40 h. p., 24 square feet of grate, 11.66 pounds per hour per square foot of grate.

60 h. p., 35 square feet of grate, 12.00 pounds per hour per square foot of grate.

It may be as well to refer to chimneys and flues, and add that the average height of chimneys above the surface of the grate for stationary boilers should be taken as from fifty to sixty feet, and the sectional area to conform to Boulton & Watt's rule, (as quoted by Bourne,) which is, "Multiply the number of pounds of coal consumed under the boiler per hour by twelve, and divide the product by the square root of the height of the chimney in feet, and the quotient is the proper area of the chimney in inches at

the smallest part." The rule, though appropriate for land boilers of moderate size, is not applicable to powerful boilers with internal flues, such as those used in steam-vessels in which the sectional area of the chimney is from six to eight square inches per horse-power.

The sectional area of tubes or flues, and the setting of the boiler, must also be properly proportioned so that the escaping gases, as they leave the steam-generating surface of the boiler, be not more than 300° above the temperature of the steam. The above conditions apply particularly to stationary boilers with natural draught. We have no intention, however, to limit the test of a boiler to these conditions of grate-surface and chimney; they are incidentally mentioned as good average practice. When a forced draught is employed, as in the locomotive, we find the heating-surface sixty-five times the grate area, and eighty pounds of coal burned per square foot of grate.

These general conditions, dependent upon each other, being fulfilled, namely, a grate-surface so proportioned to the draught as to admit easily the combustion of seven pounds of anthracite coal, or combustible equal to that amount per horse-power per hour, and the escaping gases not over the temperature before mentioned, it may be safely asserted that a boiler so set, of any given horse-power, failing to evaporate that number of cubic feet of water per hour, with that amount of coal, does not produce its nominal horse-power. We may also state, in connection herewith, that a cubic foot of water evaporated into steam is abundance for one actual horse-power, when used in the cylinder of an engine without expansion; when used in a three-port slide-valve engine, cutting off during the last quarter, it will yield about 1 $\frac{1}{2}$ indicated horse-power, and will give as high as 2 $\frac{1}{2}$ indicated horse-power, according to the pressure of the steam, the point of cut-off and the type and efficiency of the engine.

IRON, To Galvanize.—To effect this result, the iron plates are first immersed in a "cleansing bath" of equal parts of sulphuric or muriatic acid and water, used warm. They are then scrubbed with emery or sand, to clean them thoroughly and detach all scales, if any are left; after which they are immersed in a "preparing bath," of equal parts of saturated solutions of chloride of zinc and chloride of ammonium, from which bath they are directly transferred to the fluid "metallic bath," consisting of twenty chemical equivalents of zinc to one of mercury, or, by weight, six hundred and forty pounds of zinc to one hundred and six of mercury, to which are added from five to six ounces of sodium. As soon as the iron has attained the temperature of this hot fluid bath, which is only 680° Fahr., it may be removed, and will then be found thoroughly coated with zinc.

Care must be taken not to leave the plates too long immersed in this bath, as its affinity for iron is such that they may become dissolved. This is the case with thin plates of wrought-iron, which, even when one eighth of an inch thick, may be dissolved in a few seconds. It is safe, therefore, to let the bath previously act on some wrought-iron, so that it dissolves a portion of it, in order to satisfy its inconveniently great affinity for this metal.

From what has been said, it is clear that this

method produces not only a superficial zinc coating, but also a layer of an alloy of zinc and iron. This can not peel off, but can only be lost by oxidation of the zinc, which protects the iron as long as this oxidation lasts. The "galvanic" protection, of course, ceases as soon as the last of the metallic zinc has become oxidized.

IRON CASTINGS, Ornamentation of.—Since Zimmerman, of Berlin, began to make his exquisite iron castings many things both useful and ornamental have been produced in cast iron. But iron being so liable to rust, it is desirable to protect it from the influence of the atmosphere. This is usually effected by means of a bronze paint. The bronze paint used to coat the Berlin castings is made of ferro-cyanide of copper, which forms a rich brown paint with a metallic lustre. The ferro-cyanide of copper is easily made in the following manner: A solution of sulphate of copper is taken and to it is added gradually a solution of ferro-cyanide of potassium, when a brown precipitate will be produced. This, when mixed with a suitable vehicle, is used as a basis for all the different colored bronzing, whether yellow, green or brown.

The French use the green bronzing very much, which may be produced in the following manner: When the ground has been produced with the above paint, and before it is quite dry, it is dusted over with copper bronze powder, and allowed to dry thoroughly, and then the loose powder is brushed off and the article is polished; it will then appear like bright copper. The only thing required to produce the green tint is to wash the articles gently over with a solution of acetate of copper and allow it to dry gradually. When perfectly dry, the higher parts of the article must be rubbed with a piece of clean rag to cause the brown copper color to appear. The article will look like a bronze which has become green by age. The common brown bronze is produced by brushing the above bright copper colored bronze over with black lead; and the pale or yellow bronze is produced by using yellow bronze or brass powder in place of the copper powder above referred to. Those who wish a more solid and durable bronze than bronze paint and powder will produce, coat the iron by electricity with copper or brass, and produce the different colors by the same means as those used to color the copper and brass colors produced by the powders.

An easy method of coating cast-iron with copper is that of M. Oudré. He first coats the cast-iron with a metallic paint, and then electro-deposits copper upon it in a bath of sulphate of copper. A modification of his process is sometimes used—a brass powder being used instead of copper powder. This brass powder is produced in the following manner: Equal parts of copper and tin are melted together, and when cold the alloy is powdered in a mortar and sifted; this can easily be done, for this alloy is as brittle as glass. This powder is mixed with the ferro-cyanide of copper paint, which makes a very good conducting surface and takes the copper well in the sulphate of copper bath, and the paint adheres very firmly to the iron.

For brassing iron the method is not quite so simple. For brassing direct on the iron the iron is required to be scrupulously clean, or the deposit will not adhere; but the easiest way is first to coat the article with copper by Oudré's pro-

cess, and then, after thoroughly rinsing it in clean water, transfer it to the brassing solution, which is formed and worked in the following manner, according to Morris and Johnson's process:—Dissolve 1 lb. of cyanide of potassium, 1 lb. of carbonate of ammonia, 2 oz. cyanide of copper, and 1 oz. of cyanide of zinc in 1 gallon of water, and work the solution at 150° Fahr., with a large brass anode and a powerful battery. To increase the proportion of zinc add carbonate of ammonia or lower the temperature. We have tried this method of depositing brass, and have found it a very good one; but the electrolytic processes are very little used for bronzing because they are more difficult, consequently more expensive.

IRON, To Give the Color of Copper.—Take 1 oz. of copper-plates, cleansed in the fire; 3 oz. of *aqua fortis*; dissolve the copper, and when it is cold use it by washing your iron with it by the help of a feather; it is presently cleansed and smooth, and will be of a copper color; by much using or rubbing it will wear off, but may be renewed by the same process.

IRON, To Preserve from Oxidization.—Among the many processes and preparations for preserving iron from the action of the atmosphere, the following will be found the most efficient in all cases where galvanization is impracticable; and, being unaffected by sea water, it is especially applicable to the bottoms of iron ships, and marine work generally: Sulphur, 17 lbs.; caustic potash (lye of 35° B.), 5 lbs., and copper filings, 1 lb. To be heated until the copper and sulphur dissolve. Heat, in another vessel, tallow, 750 lbs., and turpentine, 150 lbs., until the tallow is liquefied. The compositions are to be mixed and stirred together while hot, and may be laid on, as paint, to the iron.

IRON WORK, To Paint.—There is no production for iron work so efficacious as well boiled linseed oil, properly laid on. The iron should be first well cleaned and freed from all rust and dirt; the oil should be of the best quality, and well boiled, without litharge or any dryer being added. The iron should be painted over with this, but the oil must be laid on as bare as possible, and on this fact depends in a great measure the success of the application, for if there be too thick a coat of oil put upon the work, it will skin over, be liable to blister, and scarcely ever get hard; but if iron be painted with three coats of oil, and only so much put on each coat as can be made to cover it by hard brushing, we will guarantee that the same will preserve the iron from the atmosphere for a much longer time than any other process of painting. If a dark coloring matter be necessary, we prefer burnt umber to any other pigment as a stain; it is a good hard dryer, and has many other good properties, and mixes well with the oil without injuring it.

IRON, To Improve when Poor.—Black oxide of manganese 1 part; copperas and common salt 4 parts each; dissolve in soft water and boil until dry; when cool pulverize and mix quite freely with nice welding sand. When you have poor iron which you cannot afford to throw away, heat it and roll it in this mixture, working for a time, re-heating, etc., will soon free it from all impurities, which is the cause of its rottenness.

IRON RAILINGS, Decay of.—Every one must have noticed the destructive combination of lead and iron, from railings being fixed in stone

with the former metal. The reason for this is, that the oxygen of the atmosphere keeps up a galvanic action between the two metals. This waste may be prevented by substituting zinc for lead, in which case the galvanic influence would be inverted; the whole of its action would fall on the zinc: the one remaining uninjured, the other nearly so. Paint formed of the oxide of zinc, for the same reason preserves iron exposed to the atmosphere infinitely better than the ordinary paint composed of the oxide of lead.

IRON, To Tin.—To tin iron, clean the surface with dilute sulphuric acid—scratch-brushing if necessary—until the entire surface is bright. Take it from the acid, and dip it in a bath of hot lime water, and rub dry with bran or sawdust. Then dip it in melted tin, having upon its surface a stratum of melted tallow.

IRON SLAG CEMENT.—A new form of cement, of much value, may, it is said, be prepared by finely pulverizing the slag of iron furnaces, and passing this through a fine sieve. This powder is then to be mixed in a mill with calcined gypsum, to which a variable amount of soluble phosphate of lime has been previously added. The best proportion of the different ingredients is said to consist of 700 parts of gypsum and 300 of slag, to which, for use in the open air, 28 parts of soluble phosphate of lime are to be added. This, however, may be replaced by a corresponding quantity, six to fourteen parts, of phosphoric or boric acid, or any other substance capable of combination with the iron. The superphosphate of lime may also be substituted for the soluble phosphate. For this, however, an equal quantity of slag must be used. On the other hand, if the quantity of soluble phosphate of lime is increased, the sulphate may be entirely omitted.

It is always necessary to have the different ingredients finely pulverized and well mixed. When used, a sufficient quantity of water is to be added, and the whole thoroughly stirred together. With these substances blocks can be made as hard as marble, and capable of imitating this substance very closely. For this purpose the necessary moulds are to be laid upon a porous bed—gypsum, for instance—and subjected, by means of a screw or hydraulic press, to a great pressure. The cement, thus compressed, is removed from the mould in the form of a very hard block, which takes as fine a polish as marble, and may be stained or colored previous to the pressure in such a way as closely to resemble the different colors of this rock. This artificial marble resists the influence of air, moisture, and frost, and is said to be well adapted for the fronts of houses, floor tiles, etc.

IRON, To Test the Quality of.—Iron men of long experience are often able, or at least claim to be able, to tell the quality of iron by the eye alone. But the test of the eye in deciding the quality of any iron must not be definitely relied upon. It has been laid down that good wrought-iron should be silvery white, fibrous, having a fresh and somewhat reflex appearance in its fibres, silky; when carbon is in excess, it is claimed to have a bluish, and often gray color; sulphur in excess, a dead color, with a tinge of blue; silica, phosphorus, and carbon in excess, a bright color, which is the more beautiful the more silica and phosphorus exist. But the lustre of iron does not depend principally upon its color, for pure iron, though silvery white, reflects little

light. A small quantity of carbon in chemical combination, as well as of phosphorus or silica, increases the brilliancy of its lustre, while the lustre is generally diminished by silica, lime, sulphur, magnesia, or carbon in larger quantities. The most reliable test is ductility and malleability, with a due admixture of the eye-test just described.

IRON, To Prevent Welding.—Where it is desired to weld two bars of iron together, for making axletrees or other purposes, through which you wish to have a bolt-hole, without punching out a piece of the iron, you will take a piece of wet paste-board, the width of the bar and the length you desire not to weld, and place it between the two pieces of iron, and hold them firmly upon the pasteboard while taking the heat, and the iron will weld up to the pasteboard, but not where it is; then open the hole, with swedge and punch, to the desired size.

IVORY, To Silver.—Immerse the ivory in a weak solution of nitrate of silver till it takes upon itself a bright yellow color; take it then from the solution and expose, under water, to the rays of the sun. In two or three hours it will become black; but on taking it out of the water and rubbing it, the blackness will change to a beautiful silvering.

JAPANNING on Metal, Wood and Paper.

—Japanning on metal, wood, and paper is executed in much the same manner as similar works in spirit or oil varnishes, except that every coat of color or varnish is dried by placing the object in an oven or chamber called a stove, heated by flues to as high a temperature as can safely be employed without injuring the articles, or causing the varnish to blister or run. For ornamental works, the colors ordinarily employed by artists are used; they are ground in linseed oil or turpentine, and are afterwards brought to a proper consistence for working by mixing them with copal or anime varnish. The latter is generally used, as it dries quicker, and is less expensive than the copal varnish.

For black japanned works, the ground is first prepared with a coating of black, made by mixing drop ivory black to a proper consistence with dark-colored anime varnish, as this gives a blacker surface than would be produced by the japan alone. The object is then dried in the stove, three or four coats of japan are afterwards applied, and the work is dried in the stove between every coat. If the surface is required to be polished, as for the best works, five or six coats of japan are necessary, to give sufficient body to prevent the japan being rubbed through in the polishing.

For brown japanned works, the clear japan alone is used as the ground, or umber is mixed with the japan to give the required tint, and the work is afterwards dried in the oven, in the same manner as black japan.

For colored works no japan is used, but they are painted with the ordinary painters' colors, ground with linseed oil or turpentine, and mixed with anime varnish; and the work is dried in the oven in the same manner as the black japan.

To protect the colors, and give brilliancy and durability to the surface, the work is afterwards varnished with copal or anime varnish, made without driers. Two or three coats of varnish suffice for ordinary works, and five or six for the best works that are polished. Very pale varnish is of course required for light colors.

Ornamental devices are painted on the objects in the usual manner, after the general color of the ground has been laid on. The colors are dried in the stove, and the work is finally varnished and polished just the same as plain colors, but more carefully.

Metal works require no other preparation than cleaning with turpentine, to free them from grease or oil, unless the latter should happen to be linseed oil, in which case the cleaning is generally dispensed with, and the articles are placed in the stove and heated until the oil is baked quite hard.

Wood that is intended to be used for the best japanned work, requires to be thoroughly well dried before it is made up, or otherwise it will be subject to all the evils of shrinking, warping, and splitting, when exposed to the heat of the stove. To avoid these evils, the wood, after having been well seasoned in the usual manner, by exposure to the air, is sawn out nearly to the required forms, and baked for several days in the japanner's stove, the heat of which is gradually increased; and the wood is afterwards worked up into chairs, tables, trays, and similar articles, which are afterwards again exposed to the heat of the stove, and any cracks or other imperfections, that may be thus rendered apparent, are carefully stopped with putty, or white lead, before the japanning is commenced.

JEWELRY, To Clean.—Dissolve one ounce of cyanide of potassium in three gills of soft water. Turn up the end of a piece of brass or iron wire into a hook. Attach to it the article to be cleaned, and immerse it in the solution, shaking it backward and forward for a second or two, then take it out and rinse well in clean water. Wash it with warm water and soap to remove any film of cyanide that may remain; rinse again, dip into spirits of wine, and dry in boxwood sawdust. The advantage of dipping in spirits of wine is the immediate drying of the work without any sticking of the sawdust to it. When done with the solution, put it in a bottle and cork tightly. It may be used again and again for some months. Do not forget to label the bottle—Poison. One caution is necessary; do not bend over the solution so as to inhale its odor, nor dip the fingers in it; if one of the articles drops from the hook, better empty the solution into another vessel. The cyanide is a violent poison, and although there is no danger in cautiously using it, carelessly inhaling it is injurious, and its absorption through the pores of the skin even more so.

JEWELRY (Gilt), To Clean.—Take half a pint of boiling water, or a little less, and put it into a clean oil flask. To this add one ounce of cyanide of potassium, shake the flask, and the cyanide will dissolve. When the liquid is cold, add half a fluid ounce of liquor ammonia, and one fluid ounce of rectified alcohol. Shake the mixture together, and it will be ready for use. All kinds of gilt articles, whether Birmingham ware or "articles de Paris," which have become discolored, may be rendered bright by brushing them with the above mentioned fluid.

JEWELERS ROUGE.—1. Dissolve sulphate of iron in hot water, add a solution of pearl ash as long as any precipitate falls, wash this often with warm water, drain it, and calcine to a bright red color.—2. Precipitate a dilute solution of sulphate of iron, with ammonia in excess, wash and ex-

press the precipitate, then calcine it to redness. Used as a polishing powder, and for covering razor strops.

LIGHTNING RODS.—The best method of erecting and constructing lightning rods, according to Prof. Henry, is as follows:—

1. The rod should consist of round iron of about one inch in diameter; its parts, throughout the whole length, should be in perfect metallic continuity, by being secured together by coupling ferrules.

2. To secure it from rust the rod should be coated with black paint, itself a good conductor.

3. It should terminate in a single platinum point.

4. The shorter and more direct the course of the rod to the earth the better; bendings should be rounded, and not formed in acute angles.

5. It should be fastened to the building by iron eyes, and may be insulated from these by cylinders of glass.

6. The rod should be connected with the earth in the most perfect manner possible, and nothing is better for this purpose than to place it in metallic contact with the gas-pipes, or, better, the water-pipes of the city. This connection may be made by a ribbon of copper or iron soldered to the end of the rod at one of its extremities, and wrapped around the pipe at the other. If a connection of this kind is impracticable, the rod should be continued horizontally to the nearest well, and then turned vertically downward until the end enters the water as deep as its lowest level. The horizontal part of the rod may be buried in a stratum of pounded charcoal and ashes. The rod should be placed, in preference, on the west side of the building. A rod of this kind may be put up by an ordinary blacksmith. The rod in question is in accordance with our latest knowledge of all the facts of electricity. Attempted improvements on it are worthless, and, as a general thing, are proposed by those who are but slightly acquainted with the subject.

MEDALS, Moulds for.—Take a thin piece of wood, of the thickness of the cast around the edge. Then cut a hole and fit in the metal perfectly. Dampen some soft newspaper, and spread over the face. Beat to a pulp about one eighth inch thick all over one face of the medal, and about one half inch around on the wood. Now spread some more over without beating, and clamp fast to the wood. Dry by the fire perfectly. That will remove when dry. Then operate with the other side in the same manner. He will then have moulds more perfect than can be made in any other way I know of, except they are made of metal. Let him take out the medal, and place the papers in position, making a vent through the wood for air and gases. He need not be afraid of the paper's burning.

MAGNESIUM.—The metallic base of the earth magnesia. The existence of this metal was demonstrated by Sir H. Davy in 1808, but it was first obtained in sufficient quantity to examine its properties, by Bussy in 1830.

Introduce 5 or 6 pieces of potassium about the size of peas, into a glass tube retort, and over the potassium lay a sufficient number of small fragments of chloride of magnesium to cover it. The latter must then be heated to near its point of fusion, when the flame of the lamp must be applied to the potassium, so that its vapor may

pass through the stratum of heated chloride. As soon as the vivid incandescence that follows is over, throw the mass into water, and collect the insoluble metallic portion.

Color and lustre resemble silver, malleable and fusible at a red heat, unaffected by dry air and water; burns with brilliancy in oxygen gas, yielding oxide or protoxide of magnesium, or magnesia, and inflames spontaneously in chlorine, yielding chloride of magnesium. It dissolves in the acids with the evolution of hydrogen gas, and pure salts of magnesia result. Chloride of magnesium is best prepared by dissolving magnesia in muriatic acid, evaporating to dryness, adding an equal weight of muriate of ammonia, projecting the mixture into a red-hot platinum crucible, and continuing the heat till a state of tranquil fusion be attained. On cooling it forms a transparent, colorless, and very deliquescent mass. Iodide, fluoride, and bromide of magnesium may be prepared by dissolving magnesia in hydriodic, hydrofluoric, and hydrobromic acids.

METALS, Fancy Coloring for.—1. A solution is made in the following manner:—Dissolve four ounces of the hyposulphite of soda in one and a half pint of water, and then add a solution of one ounce of acetate of lead in the same quantity of water. Articles to be colored are placed in the mixture which is then gradually heated to boiling point. The effect of this solution is to give iron the effect of blue steel; zinc becomes bronze; and copper or brass becomes successively yellowish, red, scarlet, deep blue, light blue, bluish white, and, finally, white, with a tinge of rose. This solution has no effect on lead or tin.—2. By replacing the acetate of lead in the solution by sulphate of copper, brass becomes first of a fine rosy tint, then green, and finally of an iridescent brown color. Zinc does not color in this solution—it throws down a precipitate of brown sulphuret of copper; but if boiled in a solution containing both lead and copper, it becomes covered with a black adherent crust, which may be improved by a thin coating of wax.—3. If the lead solution be thickened with a little gum tragacanth, and patterns be traced with it on brass which is afterward heated to two hundred and twelve degrees, and then plunged in solution No. 1, a good marked effect is produced.

METAL, To Clean.—Mix $\frac{1}{2}$ pint of refined neat's-foot oil, and $\frac{1}{4}$ a gill of spirit of turpentine. Scrape a little rotten-stone; wet a woolen rag with the liquid, dip it into the scraped kernel, and rub the metal well. Wipe it off with a soft cloth, polish with dry leather, and use more of the kernel. In respect to steel, if it is very rusty, use a little powder of pumice with the liquid, on a separate woolen rag first.

METALS, Paste for Cleaning.—Take oxalic acid, 1 part; rotten-stone, 6 parts. Mix with equal parts of train oil and spirits of turpentine to a paste.

METAL (Specula), for Telescopes.—Melt 7 lbs. of copper, and when fused add 3 lbs. of zinc and 4 lbs. of tin. These metals will combine to form a beautiful alloy of great lustre, and of a light yellow color, fitted to be made into specula for telescopes. Mr. Mudge used only copper and grain tin, in the proportion of 2 lbs. to $14\frac{1}{2}$ ounces.

METAL SHEATHING for Ships.—Best selected copper, 60 parts; best zinc, 40 parts;

melt together in the usual manner, and roll into sheets of suitable thickness. This composition resists oxidation from exposure to sea-water, and prevents the adhesion of barnacles.

METAL, Printer's Type.—Put into a crucible 10 lbs. of lead, and when it is in a state of fusion, throw in 2 lbs. of antimony; these metals, in such proportions, form the alloy of which common printing types are made. The antimony gives a hardness to the lead, without which the type would speedily be rendered useless in a printing press. Different proportions of lead, copper, brass, and antimony, frequently constitute this metal. Every artist has his own proportions, so that the same composition cannot be obtained from different foundries; each boasts of the superiority of his own mixture.

METAL, White.—1. Melt together 10 oz. of lead, 5 oz. of bismuth, and 4 drs. of regulus of antimony.—2. Melt together 2 lbs. of regulus of antimony, 8 oz. of brass, and 10 oz. of tin.

METALS, Writing Inscriptions on.—Take $\frac{1}{2}$ lb. of nitric acid and 1 oz. of muriatic acid. Mix, shake well together, and it is ready for use. Cover the place you wish to mark with melted bees-wax; when cold, write your inscription plainly in the wax clear to the metal with a sharp instrument; then apply the mixed acids with a feather, carefully filling each letter. Let it remain from one to ten minutes, according to appearance desired; then throw on water, which stops the process, and remove the wax.

MOIRÉE METALLIQUE, A Method of Ornamenting the Surface of Tin Plate by Acid.—The plates are washed by an alkaline solution, then in water, heated, and sponged or sprinkled with the acid solution. The appearance varies with the degree of heat and the nature and strength of the acids employed. The plates, after the application of the acids, are plunged into water slightly acidulated, dried, and covered with white or colored varnishes. The following are some of the acid mixtures used: Nitro-muriatic acid, in different degrees of dilution; sulphuric acid, with 5 parts of water; 1 part of sulphuric acid, 2 of muriatic acid, and 8 of water; a strong solution of citric acid; 1 part of nitric acid, 2 of sulphuric acid, and 18 of water. Solution of potash is also used.

NICKEL PLATING.—The advantages of electro-plating with nickel are: First, that the coating of nickel is quite hard, nearly as hard as iron, so that it keeps its polish much better than Britannia metal or any other similar tin alloy—even better than brass or silver; secondly, that it adheres well, even when put on in thick layers, so that it may be easily polished; and then has a shade between that of polished steel and that of alloy of silver and copper; thirdly, that it requires no lacquer or varnish, since it does not tarnish by exposure to the air, as brass does, and even silver, when exposed to the least trace of sulphurous vapors. It retains its lustre for a very long time, being proof against oxidation under ordinary circumstances; wherefore Richter counted nickel among the noble metals. It only oxidizes at a red heat when in contact with air; when air is excluded, heat reduces its oxide to the metallic state. Plating with nickel is accomplished like other electro-plating, only the bath or nickel solution is prepared in a peculiar way. The simple soluble salts of nickel appear not adapted for the purpose; double salts are re-

quired. Becquerel, the great French chemist, prescribes a solution of the double sulphate of nickel and potassa; this solution is not patented, and may be used by every one.

A few of the methods of preparing the salts, that are or may be used, are as follows:

According to H. Rose, nickel may be separated from cobalt as follows: The mixed metals are dissolved in considerable excess of hydrochloric acid, and the solution is diluted with a very large quantity of water; a current of chlorine is then passed through the liquor for several hours, and the upper part of the flask is left filled with the gas after the current has ceased; carbonate of baryta is next added in excess, the whole digested together, with frequent agitation for fifteen or eighteen hours, and then thrown on a filter. The filtrate yields pure oxide of nickel by precipitation with caustic potassa; while the residuum on the filter, after being washed in water, dissolved in hot hydrochloric acid, and the baryta precipitated with a sulphuric acid, furnishes, with hydrate of potassa, a precipitate of hydrated oxide of cobalt, free from nickel, which, when washed and dried, is reduced in a platinum or porcelain crucible by hydrogen gas.

Acetate of Nickel.—By neutralizing acetic acid with carbonate or oxide of nickel, and gently concentrating by evaporation, so that crystals may form. Small green crystals, soluble in six parts of water.

Carbonate of Nickel.—This salt may be obtained in the manner described above in connection with the preparation of metallic nickel, or by simply adding carbonate of soda to a solution of chloride or sulphate of nickel, but in this case some hydrate of nickel is precipitated with it. The following is another formula which produces a nearly pure carbonate, but one which may still contain a little cobalt, the entire separation of which is a matter of extreme difficulty, and can only be effected in the manner recommended by Rose, described above:

The mineral (crude speiss or kupfernickel) is broken into small fragments, mixed with from one fourth to one half its weight of iron filings, and the whole dissolved in aqua regia; the solution is gently evaporated to dryness, the residue treated with boiling water, and the insoluble arseniate of iron removed by filtration; the liquid is next acidulated with hydrochloric acid, treated with sulphureted hydrogen, in excess to precipitate the copper, and after filtration is boiled with a little nitric acid, to bring back the iron to the state of sesquioxide; to the cold and largely diluted liquid a solution of bicarbonate of soda is gradually added, and the sesquioxide of iron separated by filtration; lastly, the filtered solution is boiled with carbonate of soda, in excess, and the pale green precipitate of carbonate of nickel collected, washed and dried.

It is freely soluble in the acids, and is chiefly employed to prepare the salts and other compounds of nickel.

Chloride of Nickel.—From carbonate or oxide of nickel and hydrochloric acid, as the acetate. Small green crystals, which are rendered yellow and anhydrous by heat, unless they contain cobalt, when the salt retains a tint of green.

Oxalate of Nickel.—By adding a strong solution of oxalic acid to a like solution of sulphate of nickel, and collecting the pale bluish-green pre-

cipitate which forms after a time. Used to prepare both metallic nickel and its oxide.

Oxides of Nickel.—There are two oxides of nickel, but only one of them (protoxide) acts as a base:

Protoxide of Nickel.—1. By heating the nitrate, carbonate or oxalate, to redness in open vessels. Anhydrous.

2. By precipitating a soluble salt of nickel with caustic potassa. Hydrated. An ash-gray powder, freely soluble in acids, forming the ordinary salts of nickel.

Sesquioxide of Nickel.—By passing chlorine through water holding the hydrated protoxide in suspension; or by mixing a salt of nickel with bleaching powder. An insoluble, black powder, which is decomposed by heat.

Sulphate of Nickel.—From carbonate or oxide of nickel and dilute sulphuric acid as the acetate. Green prismatic crystals, soluble in three parts of cold water. With the sulphates of potassa and ammonia, it forms beautiful double salts.

It may also be that ammonia, potassic or sodic chlorides will prove useful. Solutions of the respective chlorides (chloride of nickel and of the chloride which it is desired to unite with it) are poured together and allowed to crystallize.

OIL for Sewing Machines, Watches, etc.—Refined oil, for fine mechanism, can be prepared by putting zinc and lead shavings, in equal parts, into good Florence olive oil, and placing it in a cool place till the oil becomes colorless.

OIL, Watchmakers'.—This is prepared by placing a clean slip of lead in a small, white glass bottle filled with olive oil, and exposing it to the sun's rays for some time, till a curdy matter ceases to deposit, and the oil has become quite limpid and colorless.

PEARLS or Delicate Articles, To Hold.—Eastern jewelers resort to an ingenious plan for firmly securing in any desired position such pearls as they wish to drill or work upon. The gems are first fitted loosely in holes bored in a piece of soft wood. A few drops of water are then sprinkled over them, and this penetrating the fibres, causes the wood to swell and the pearl is held as in a vise, but without marring it or in any way depreciating its value. After a time the water evaporates, the fibres gradually relax, and the gem is again set free.

PEWTER, Common.—Melt in a crucible 7 lbs. of tin, and when fused throw in 1 lb. of lead, 6 oz. of copper and 2 oz. of zinc. This combination of metals will form an alloy of great durability and tenacity; also of considerable lustre.

PEWTER, Best.—The best sort of pewter consists of 100 parts of tin, and 17 of regulus of antimony.

PEWTER, Hard.—Melt together 12 lbs. of tin, 1 lb. of regulus of antimony, and 4 oz. of copper.

PINCHBECK.—1. Put into a crucible 5 oz. of pure copper; when it is in a state of fusion add 1 oz. of zinc. These metals combine, forming an alloy not unlike jeweler's gold; pour it into a mould of any shape. This alloy is used for inferior jewelry.

Some use only half this quantity of zinc, in which proportion the alloy is more easily worked, especially in the making of jewelry.

2. Melt together 1 oz. of brass with $1\frac{1}{2}$ or 2 oz. of copper, fused under a coat of charcoal dust.

PLATING and GILDING without a Battery.—A very useful solution of silver or gold for plating or gilding without the aid of a battery may be made as follows: Take, say, 1 ounce of nitrate of silver, dissolved in 1 quart of distilled or rain water. When thoroughly dissolved, throw in a few crystals of hyposulphite of soda, which will at first form a brown precipitate, but which eventually becomes redissolved if sufficient hyposulphite has been employed. A slight excess of this salt must, however, be added. The solution thus formed may be used for coating small articles of steel, brass, or German silver, by simply dipping a sponge in the solution and rubbing it over the surface of the article to be coated. I have succeeded in coating steel very satisfactorily by this means, and have found the silver so firmly attached to the steel (when the solution has been carefully made) that it has been removed with considerable difficulty. A solution of gold may be made in the same way, and applied as described. A concentrated solution of either gold or silver thus made, may be used for coating parts of articles which have stripped or blistered, by applying it with a camel hair pencil to the part, and touching the spot at the same time with a thin clean strip of zinc.

PLATING on Iron and Steel.—Take two quarts rain water, dissolve two pounds cyanide of potassium, and filter. This solution is only for steel or iron. In order to plate steel or iron, dip it into pure sulphuric acid for one minute, then clean with pumice stone and brush; rinse, and hang in cyanide solution of potassium for three minutes, or until it becomes white; then hang in silver solution until plated heavy enough.

PLATED METAL, Test for.—A cold solution of bichromate of potassa in nitric acid is, according to Dr. Böttger, an excellent test for the genuineness of silver-plating on metals. The metallic surface to be tested is first of all cleaned with strong alcohol, in order to remove dirt, fatty matter, and especially any varnish. A drop of the test-fluid is then applied to the metallic surface by means of a glass rod, and immediately afterwards washed off with some cold water. If pure silver is present, there will appear a blood-red colored mark (chromate of silver). Upon German silver the test-liquid appears brown, but, after washing with water, the blood-red colored mark does not appear; the so-called Britannia metal is colored black; on platinum no action is visible; metallic surfaces coated with an amalgam of mercury yield a reddish speck, which, however, is entirely washed off by water; on lead and bismuth the test-liquid forms a yellow-colored precipitate; zinc and tin are both strongly acted upon by this test-liquid; the stain, as regards the former metal, is entirely removed by water, while, as regards the latter, the test-liquid is colored brownish, and addition of water produces a yellow precipitate which somewhat adheres to the tin.

PLASTER FIGURES, To give the Appearance of Bronze.—Make a preparation of palm soap, five ounces; sulphate of copper, one and a half ounces, and sulphate of iron, one and a half ounces. Dissolve the soap in rain water in one vessel and the sulphates in another. Put together and let settle, then pour off the water. Dry the precipitate, and apply to the figure by mixing as a paint with linseed oil and turpentine.

POLISHED IRONS, To Preserve from

Rust.—Polished iron-work may be preserved from rust by a mixture not very expensive, consisting of copal varnish intimately mixed with as much olive-oil as will give it a degree of greasiness, adding thereto nearly as much spirit of turpentine as of varnish; or varnish with wax dissolved in benzine. The cast-iron work is best preserved by rubbing it with black-lead.

But where rust has begun to make its appearance on grates or fire-irons, apply a mixture of tripoli, with half its quantity of sulphur, intimately mingled on a marble slab and laid on with a piece of soft leather; or emery and oil may be applied with excellent effect; not laid on in the usual slovenly way, but with a spongy piece of the fig-tree fully saturated with the mixture. This will not only clean, but polish, and render the use of whitening unnecessary.

POLISHING POWDER.—Jewelers and others who have use for jewelers' rouge as a polish for glass or metal will find the following a perfect recipe: Dissolve any quantity of good green vitriol (sulphate of iron) in enough water not to leave a sediment. When well dissolved, drop into the water small lumps of carbonate of ammonia until the iron falls to the bottom in the form of a fine powder (the peroxide of iron). Keep on dropping in ammonia until no more iron falls. Let the water stand awhile until it clears, then pour it off. Turn the iron powder between two sheets of blotting paper, and press it to get it as dry as possible. Then turn it into an old teacup or porcelain crucible and stand it over a clear good fire until the iron is just red hot (in the dark) and no more. When this is done you have the best polishing powder known in the trade at a very trifling cost.

PUTTY POLISHERS.—1. Melt tin, rake off the dross as it is formed, and calcine this dross till it becomes whitish.—2. Melt tin 1 oz. with an equal weight, or $1\frac{1}{2}$ oz. of lead, and then raise the heat so as to render the mixed metals red hot, when the tin will be immediately slung out in the state of putty. Both are very hard, used for polishing glass and japan work, and to color opaque white enamel.

RUST, To Remove from Polished Steel or Iron.—Sometimes rust can be removed from polished iron or steel with little difficulty; but sometimes it can not be made to disappear without polishing the surface anew. Rust is oxide of iron. The oxygen of the atmosphere unites with the iron chemically, thus forming a thin scale on the surface, not one thousandth part of an inch in thickness. Red rust may be formed on the polished surface a thousand times without materially corroding the metal, provided it be removed soon after it has formed. The usual manner of removing red rust is to cover the rusty portion with common olive oil, and rub it in well with a woolen cloth. After it has stood a few hours, rub the parts with finely pulverized slaked lime, or Spanish whiting, until the rust is all removed. If red rust is allowed to accumulate until the polished surface is corroded, sweet oil and a severe rubbing will seldom remove it. The entire surface must be repolished with emery, or some other grit, before black rust will disappear from polished steel or any other metal.

RUSSIAN SHEET-IRON, Manufacture of.—The refined iron is hammered under the tilt-hammer into narrow slabs, calculated to pro-

duce a sheet of finished iron two archins by one, (fifty-six inches by twenty-eight inches,) weighing when finished from six to twelve pounds. These slabs are called *balvanky*. They are put in the reheating furnaces, heated to a red heat, and rolled down in three operations to something like a sheet, the rolls being screwed tighter as the surface gets thinner. This must be subsequently hammered to reduce its thickness and to receive the *glance*. A number of these sheets having been again heated to a red heat, have charcoal, pounded to as impalpable a powder as possible, shaken between them through the bottom of a linen bag. The pile, then receiving a covering and a bottom in the shape of a sheet of thicker iron, is placed under a heavy hammer; the bundle, grasped with tongs by two men, is poked backward and forward by the gang, so that every part may be well hammered. So soon as the redness goes off, they are finished, so far as this part of the operation goes. So far they have received some of the *glance*, or necessary polish; they are again heated, and treated differently in this respect; but instead of having the powdered charcoal strewed between them, each two red-hot sheets have a cold-finished sheet put between them; they are again hammered, and after this process are finished, as far as thickness and *glance* goes.

Thrown down separately to cool, they are taken to the shears, placed on a frame of the regulation size, and trimmed. Each sheet is then weighed, and after being thus assorted in weights, are finally sorted into first, second, and thirds, according to their *glance* and freedom from flaws and spots. A first-class sheet must be like a mirror, without a spot upon it. One hundred puds of *balvanky* make seventy puds of finished sheets; but this allowance for waste is far too large, and might easily be reduced. Four heats are required to finish.

The general weight per sheet is from six to twelve pounds, the larger demand being from ten to eleven pounds; but they are made weighing as much as thirty pounds, and may then almost be called thin boiler-plates, being used for stoves, etc. Besides the finished sheets, a quantity of what are called red sheets are made, which are not polished, and do not undergo the last operation.

SAWS, To Mend when Broken.—Pure silver 19 parts; pure copper 1 part; pure brass 2 parts; all are to be filed into powder and intimately mixed. Place the saw level upon the anvil, the broken edges in close contact, and hold them so; now put a small line of the mixture along the seam, covering it with a large bulk of powdered charcoal; now, with a spirit-lamp and a jewellers' blow-pipe, hold the coal-dust in place, and blow sufficient to melt the solder mixture; then with a hammer set the joint smooth, if not already so, and file away any superfluous solder; and you will be surprised at its strength.

SAWS, Tempering.—The usual method of tempering saws is to heat and then dip them in oil. This process is slow, costly, and laborious. It is also disadvantageous, because the saws become warped, and require to be hammered up straight again by hand. A late improvement consists in tempering and straightening the saws at one operation. This is done by heating the saws to the proper degree, and then pressing them with a sudden and powerful stroke between

two surfaces of cold iron. A drop press is employed for the purpose. The mechanism is quite simple and inexpensive. Its use effects an important economy in the manufacture of nearly all kinds of saws, and also improves their quality.

SAW TEETH, Shape of.—The adaptation of tools, in form and construction, to the nature of the work required of them, is an important item in every branch of mechanical industry, and in none more vitally than in the sawing of lumber. The distinction to be made according to the direction in which the saw is to run, whether across the grain or with the grain, is sufficiently plain, and is familiar to every workman in a saw mill. As the fiber of the wood to be severed in cross cutting presents a firm, almost unyielding resistance to the saw, the teeth are of an acute or lancet-like shape, cutting the wood rapidly asunder, as if with a succession of knives, and producing a fine granular sawdust; while the teeth of the rip saw, cutting with or rather separating the grain, are made comparatively large and coarse, encountering less resistance from the wood, which they tear into small chips or shavings. The experience of workmen in soft and especially in gummy or resinous woods, such as pitch pine, larch, etc., gives still more striking proof of the necessity of adapting the saw to the nature of the material in which it is to operate. To prevent the choking of the saw, and a resulting demand for additional power to maintain the motion, the points of the teeth require to be made acute and to have considerable pitch, in order to overcome the obstruction of damp sawdust accumulating in their path; and in gummy wood, an application of grease is often necessary, as a remedy for the heating and friction caused by the tendency of the resin to adhere to the saw.

It may be stated, in general terms, that for soft or yielding woods, of the class of which the willow and pine are common examples, the pitch should be greater, and the teeth larger and acutely pointed. For mahogany, rosewood, and other woods of tough and dense fiber, teeth of less size and of perpendicular pitch are appropriate. The principle which should govern the shape of saw teeth is indeed an extremely simple one, and would seem to require no formal statement, more especially as it is certain to make itself manifest, if disregarded, upon a brief experiment. In practice, however, it often fails to receive due attention, and no small amount of inconvenience and actual loss is occasioned by neglect of this material point.

SAW, To Put in Order.—First, the saw should be set; this may be done by laying the blade flat upon a piece of heavy plank or scantling, and bending the teeth with a hammer and punch. The set, or punch, can be made of a three-cornered saw file, broken off at each end, and the smallest end ground square. Set the punch square upon the tooth, but inclined from you, so that it rests mainly upon the point of the tooth, and hit it a light blow with the hammer. Every other tooth should be bent in this manner, then the saw turned over, and the operation repeated. The set already in the saw will be the guide as to the direction the tooth is to be bent. If the saw, previous to setting, is inclined to catch and jump, one of three things is the matter; the set is uneven, a few teeth are

longer than the rest, or the teeth have been filed hooking. Either of these troubles can be easily detected and remedied. If by looking along the teeth from end to end, an unevenness is seen, lay the blade upon the head of an axe, or something of the kind, and strike gently upon the sides of the teeth with a hammer until all of the set is removed; then set the saw as above directed. If after the saw is properly set, some of the teeth should be longer than others, put the blade between two thin boards, three or four inches wide, and as long as the saw; screw them firmly in a vice, the same as for filing, and run a flat saw-mill file lengthwise along the teeth until they are brought level. The saw is now ready for filing. The file should be placed between the teeth in a diagonal direction, but held level. Every other space should be filed from the small end to the handle; then the remaining spaces filed by holding the file at an opposite angle. After this operation is completed, then look across the teeth again, and if the channel between the rows of teeth terminates in the centre, the filing is good; if it terminates at one side of the centre, the full side needs more filing. If the saw catches and jumps after jointing up, it will be owing to the teeth having been filed too hooking, or, in other words, the points inclined too much towards the narrow end of the saw. This can be remedied by refiling and taking off from the lower side of the teeth enough to make them stand upright on the blade. Always file where there is sufficient light to enable you to see points distinctly. Be exceedingly careful to stop filing as soon as the tooth is filed to a perfect point. One thrust with the file after a tooth has been brought to a complete edge, will shorten it, put the saw out of order just in proportion as the point is filed off. Let the points be set uniformly, and only a little. Go over the teeth with an old file, and give them a more perfect cutting-edge. Then lay the blade flatly on a smooth board, and pass a fine-gritted whetstone along the sides of the points, to remove the wiry edge, and to give the teeth as fine a cutting-edge as practicable.

SAWS (Large), Sharpening the Teeth of.—In extensive lumber districts, where large saws of any description are employed, the mere cost of the files necessary for filing the teeth is an item of great expense during the year. The teeth of a large circular saw for cutting logs into lumber will frequently be equivalent to the cutting edge of a straight saw twelve to sixteen feet in length. When the points of only one or two of the teeth happen to get dulled, the expense for files alone, not including labor, will frequently exceed one dollar to put the saw in order, especially if the length of the teeth be maintained by filing into the blade at the base of each tooth as much as the points are filed off.

In lieu of large files, foremen of many saw-mills employ a narrow grindstone hung on a journal having turned bearings neatly fitted to metallic boxes, so that the stone must revolve true. Any grindstone may be employed for such a purpose by turning a small portion of the periphery of the desired form to fit the spaces between the teeth. One side of the stone should be dressed at a right angle with a line cutting the centre of the journal, for grinding the face-edge of the teeth; and the opposite side should be beveled to correspond with the back of each tooth.

The most efficient tool for turning off the grindstone may be made of a bar of Swede's iron, by drawing out one end about as large as a man's little finger, and turning up about half an inch of the point. Such a tool, made of very soft iron, will be found much more efficient than if it were steel. When turning the stone off, let it revolve about one hundred times per minute.

Now, make a table on which to place the saw when grinding the teeth; and dress both the front and back of each tooth square across the blade. Let the periphery of the stone be kept wet, when in use; as the grit will cut cleaner than if the stone were dry. Water will also prevent heating the teeth. After the teeth have been ground properly, if it is desirable that the cutting points should be flaring, for sawing across the grain of timber, use a triangular file for beveling the face of every tooth. The backs of teeth do not need to be beveled in any saw, as there is nothing gained by it. Furthermore, it will always be found more expensive, both in files and in labor, than to file square across the teeth. For sawing with the grain, both the face and back should be dressed square across the blade. When a saw is put in order for cutting across the grain, if only one-eighth of an inch of the points be filed obliquely on the face-edge, the saw will cut quite as rapidly as if the teeth were beveled both on the face and back edges.

A grindstone will often save from fifty to one hundred dollars per annum in the value of large files.

In many machine-shops and manufactories, where a large number of small saws are employed, emery-wheels are used extensively for sharpening. The emery-wheel is hung on a neatly turned mandrel, and held between iron collars, like a circular saw. The periphery is made of the requisite form to fit the teeth. In some instances, when circular saws are being sharpened by an emery-wheel, the saw is secured to a journal, as it rests flat on the table, so that every tooth may be dressed with greater precision than could otherwise be attained, except by filers of long experience.

SILVER, To Alloy.—Copper is the only less precious metal that alloys well with silver. Its addition is a decided improvement on the original, rendering it harder, finer in appearance and more sonorous; and it is astonishing to note the quantity that may be added without otherwise changing the first appearance of the metal. An alloy of silver and copper in the proportion of four-fifths silver to one of copper, is fully as white as the silver would be entirely pure. When the proportion of copper rises above one-fifth, it begins to have an influence in the color. American coin silver is one-tenth copper.

The baser white metals cannot be alloyed with silver to any great extent, owing to the fact that they impart to the compound too great a degree of brittleness. A small proportion of block tin virtually converts it into bell metal.

The following is, perhaps, the best known composition for a cheap silver: Pure silver, say one ounce; copper, one-sixth of an ounce; brass, two-thirds of an ounce; bismuth, one-third of an ounce; clean salt, two-thirds of an ounce; white arsenic, one-third of an ounce; and potash, one-third of an ounce. Melt the silver, copper

and brass first, then add the other articles in the order named. Sprinkle a very little borax into the crucible while melting—too much will have a tendency to render the metal unmanageable.

SILVER, To Clean.—Never use a particle of soap on your silver ware, as it dulls the luster, giving the article more the appearance of pewter than silver. When it wants cleaning rub it with a piece of soft leather and prepared chalk, the latter made into a kind of paste with pure water.

SILVER, Mixture for Cleaning.—Common prepared chalk, or whiting, $\frac{1}{2}$ lb.; gum camphor, $\frac{1}{4}$ oz.; aqua ammonia and alcohol, of each 1 oz.; benzine, 3 oz.; mix well together, and apply with a soft sponge, and allow it to dry before polishing.

SILVER, To keep Bright.—For the preservation of the luster of articles of silver or plated ware, when not needed for actual use for a considerable time, a coating of collodion (to be had at the drug stores), may be employed to great advantage. The articles are to be heated, and the collodion then carefully applied by means of a brush, so as to cover the surface thoroughly and uniformly. It is used most conveniently when diluted with alcohol, as for photographic purposes. Articles thus prepared exhibit no trace whatever of their covering, and have stood for more than a year in shop windows and in dwellings, retaining their white luster and color, while other pieces not thus prepared became seriously tarnished.

SILVER, Frosted.—To produce a frosted surface on polished silver, use cyanide of potassium with a brush, but do not handle it more than you can help. Get a piece of lance wood or box, and make a pair of wood pliers. The proportion should be an ounce dissolved in a half pint of water. It is very poisonous.

SILVER, Counterfeit.—Combine by fusion one part pure copper, twenty-four parts block tin, one and a half parts pure antimony, one fourth part pure bismuth and two parts clear glass. The glass may be omitted save in cases where it is an object to have the metal sonorous.

SILVER (Dead White in), To Restore.—The process for producing or restoring the dead white to silver is simple. Before attempting it, the work must be carefully examined to discover whether it has been previously repaired. Unskillful workmen often resort to "soft solder" unnecessarily. If any "soft solder" (pewter) is found about the work, the process must not be attempted. If the article is all right in that respect, pound together three parts charcoal and one of niter. Add sufficient water to form a paste. With a camel's-hair brush give the article a thin coat of the mixture, put it in a small annealing pan, and submit it to the fire until it becomes just red hot; then withdraw it from the fire, let it stand a minute, and turn it out into a weak solution of sulphuric acid (one part acid, ten parts water) in the boiling pan. Boil, pour off the acid, rinse; wash with warm water and soap, using a soft brush; dip in spirits of wine, and dry in box-wood sawdust. If any spots should still remain on the work, anneal it without the mixture, boil out and wash as before. Burnish the parts intended to be bright. Do not use the common American saltpeter. The English refined niter, although it costs more, is really less expensive, as a smaller quantity goes farther, and does the work more effectually.

Purchase at the wholesale druggists. Never neglect to dip your work in spirits of wine, and dry in box-wood sawdust. You cannot dry it properly by wiping; a moisture will remain and the gloss is lost; while by dipping in spirits, all jewelry and silver ornaments may be taken immediately, thoroughly dry, and retaining their full luster.

SILVER, German.—The best German silver may be made by melting together twenty-five parts copper, fifteen parts zinc and ten parts nickel.

SILVERING IRON.—Small wares of iron may be effectually silvered without battery thus: The articles are suspended in dilute sulphuric acid until the iron shows a clean, bright surface. After rinsing in pure water, they are placed in a bath of a mixed solution of sulphate of zinc, sulphate of copper and cyanide of potassium, and here remain until they receive a bright coating of brass. Lastly, they are transferred to a bath of nitrate of silver, cyanide of potassium and sulphate of soda, in which they quickly receive a coating of silver.

SILVER IMITATIONS.—Copper, 1 lb.; tin, $\frac{1}{4}$ oz.; melt. This composition will roll and ring very near to silver. Britannia Metal; copper, 1 lb.; tin, 1 lb.; regulus of antimony, 2 lbs.; melt together, with or without a little bismuth. Genuine German Silver: iron, $2\frac{1}{2}$ parts; nickel, $31\frac{1}{2}$ parts; zinc, $25\frac{1}{2}$ parts; copper, $40\frac{1}{2}$ parts; melt. Fine White German Silver: iron, 1 part; nickel, 10 parts; zinc, 10 parts; copper, 20 parts; melt. Pinchbeck: copper, 5 parts; zinc, 1 part; melt the copper, then add the zinc. Jewelers' Metal: copper, 30 parts; tin, 7 parts; brass, 10 parts; mix.

SILVERING.—A Bavarian has patented an improved process for silvering copper, brass and other alloys by means of a solution of silver in cyanide of potassium. The difference from the usual method consists in the use of zinc filings, with which the objects are coated; when the silvering solution is applied, an immediate deposition of a much more durable character takes place. The filings are easily removed by rinsing in water, and may be used repeatedly for the same purpose. Metallic iron may be coated with copper in the same manner, by substituting for the silver a solution of copper in the cyanide; and over this copper deposit a coating of silver may be applied.

SILVER PLATING, Solutions for.—In making any of these solutions, perfectly fine silver must be employed; or, if it be desired to use standard or other impure silver, it will be better to purify the silver by first dissolving it in nitric acid; then add about one quart of cold water to the acid solution obtained from dissolving four ounces of silver. Now throw in a few pieces of sheet copper to precipitate the silver. In a few moments the silver will begin to deposit itself upon the copper, and by continuing the process for some time, and adding a gentle heat, the whole of the silver will eventually become precipitated in the form of minute crystals. When the pure silver is thus obtained, it is to be again dissolved in two parts water and one part nitric acid.

Solution 1: Fine silver, 1 ounce; nitric acid, about 1 ounce; water, $\frac{1}{2}$ ounce.

Put the silver carefully into a Florence flask, and then pour in the acid and water; place the

flask on a sand bath for a few minutes, taking care not to apply too much heat; and, as soon as chemical action becomes violent, remove the flask to a cooler place, and allow the action to go on until it nearly ceases; when, if there be silver still undissolved, the flask may be again placed on the sand bath until the silver disappears. If, however, the acid employed has been weak, it may be necessary to add a little more. The red fumes, formed when chemical action is going on, disappear when the silver is dissolved, or when the acid has done its work. If a little black powder be visible at the bottom of the flask, it may be taken care of separately, as it is gold. I have frequently found gold in the silver purchased of a refiner; in some instances more than sufficient to pay the expense of the acid employed.

The nitrate of silver formed during the above operation should be carefully poured into a porcelain or Wedgwood capsule, and heated until a pellicle appears on the surface, when it may be placed aside to crystallize. The undissolved liquor should then be poured from the crystals into another capsule, and heat applied until it has evaporated sufficiently to crystallize. When this is done, the crystals of nitrate of silver are to be placed in a large jar or other suitable vessel, and about three pints of cold distilled water added, the whole being well stirred with a glass rod until the crystals are dissolved.

A quantity of carbonate of potassa is now to be dissolved in distilled water, and some of the solution added to the nitrate of silver, until no further precipitation takes place. It is advisable occasionally to put a little of the clear solution in a glass, or test tube, and to add a few drops of the solution of potassa, in order to ascertain whether all the silver is thrown down, or otherwise; as soon as the application of the alkaline solution produces no effect upon the solution of nitrate of silver, this operation is complete.

The supernatant liquor (that is, the fluid which remains above the precipitate) should next be carefully poured off the precipitated silver, and fresh water added; this is again allowed to settle, and the water poured off as before, which operation should be repeated several times in order to wash the precipitate thoroughly.

A quantity of cyanide of potassium is then to be dissolved in hot or cold water, and rather more than is sufficient to dissolve the precipitate added. In a few minutes the carbonate of silver will be dissolved by the cyanide, but in all probability there will be a trifling sediment at the bottom of the vessel, which may be separated from the solution by filtration, and preserved, as in all probability it will contain a little silver.

Sufficient water is now to be added to make one gallon of solution. Should the solution be found to work rather slowly at first, a little of the solution of cyanide may be added from time to time, as it is required: but it is preferable, in working a new solution, to have as small a proportion of cyanide as possible, otherwise the articles may strip, especially if they are composed of German silver.

When a silver solution has been worked for some length of time, it acquires organic matter, and is then capable of bearing, without injury, a larger proportion of cyanide.

It is necessary that the nitric acid employed for dissolving silver should be of good commercial quality, if not chemically pure, for if it contain hydrochloric acid (which is not an unfrequent adulteration), a portion of the silver dissolved will become precipitated in the form of a white flocculent powder (chloride of silver), and the success of the operation is thereby impaired.

Solution 2: To one ounce of silver, dissolved and crystallized as above directed, is to be added three pints of distilled water. The silver is to be precipitated from this by adding gradually a strong solution of cyanide of potassium. This must be done with caution, as an excess of cyanide will redissolve the precipitate. Should the operator, however, accidentally apply too much cyanide, a little nitrate of silver in solution may be added, the silver of which will be precipitated by the surplus cyanide. A portion of the solution should be placed in a wineglass occasionally, and a drop of cyanide added, until no further effect is produced by this substance.

As soon as the precipitate (which is white) has subsided, the clear solution is to be poured off, and fresh water added, this being done several times, as before, to wash the precipitate.

Three pounds of ferrocyanide of potassium (yellow prussiate of potassa) may now be dissolved in water, and added to the precipitate.

When the precipitate is dissolved, add sufficient water to make one gallon of solution, which should then be filtered before using. This solution is not very profitable to the electro-plater, as it requires fresh silver to be added frequently, owing to the fact that the anode, or silver plate, is not acted upon by the ferrocyanide, therefore the solution soon becomes deprived of its silver. It may be used, however, for experimental purposes.

Solution 3: One ounce of fine silver, dissolved and treated as before, to which add three pints of distilled water. Precipitate the silver by adding a strong solution of common salt—an excess does no harm. A single drop of hydrochloric acid will show whether all the silver is thrown down or not. The white precipitate thus formed (which is chloride of silver) is to be washed as before.

A quantity of hyposulphite of soda is next dissolved in hot distilled water, and a sufficient quantity added to dissolve the precipitate. Water is then to be added to make one gallon. This solution is decomposed by light, and should therefore be kept covered up, or in a dark place. It is not much used by electro-platers.

Solution 4: One ounce of fine silver treated as before, and dissolved in three pints of distilled water. Precipitate with common salt, and wash, as above directed. Dissolve the precipitate with a strong solution of cyanide of potassium, taking care not to add much more than will dissolve the chloride of silver. Filter carefully, at least once through the same filtering paper, and once through clean filtering paper, and then add enough distilled water to make one gallon of solution.

The above solution is very useful when it is desired to plate an article delicately white, but the silver is liable to strip when the burnisher is applied to it. This solution, however, may be employed with less fear of the work stripping, if it be used weaker, with a small surface of anode and feeble battery power.

Under all circumstances this solution is more applicable to surfaces which only require to be scratch-brushed, or which are to be left dead. Chased figures, clock dials, cast metal work, etc., may be admirably plated with this solution.

Solution 5: One ounce of fine silver, as before, and the crystals dissolved in three pints of distilled water. Add strong solution of cyanide of potassium until no further precipitation takes place. If too much cyanide be added, it will redissolve the precipitate. Pour off the supernatant liquor and wash the silver as before. Now add strong solution of cyanide to dissolve the precipitate. Make one gallon with distilled water. The solution should have a moderate excess of cyanide, and it must be filtered before using.

Solution 6: A silver solution may be made by dissolving one ounce of silver as before. Dissolve the crystals in one pint of distilled water. Next be prepared with a large vessel full of lime water, made by adding recently slaked lime to an ample quantity of water, which, it must be remembered, dissolves but a very small percentage of lime. To the clear lime water is to be added the solution of nitrate of silver, which will be converted into a dark brown precipitate (oxide of silver). When all the silver is thrown down, the clear liquor is to be poured off, and the precipitate washed as before. Now add strong cyanide of potassium solution to dissolve the oxide of silver, and make one gallon with distilled water.

This makes a very excellent solution, although it is somewhat troublesome to prepare.

Solution 7: Dissolve in one gallon of water one ounce and a quarter of cyanide of potassium, in a stoneware or glass vessel. Fill a porous cell with some of this solution, and place it in the larger vessel; the solution should be the same height in both vessels. Then put a piece of sheet copper or iron, connected with the wire which proceeds from the zinc of the battery, into the porous cell. Place in the stone vessel a piece of stout sheet silver, which must be previously attached to the wire issuing from the copper of the battery. It is well to employ several cells alternated, for this purpose, when a large quantity of solution has to be prepared; that is to say, the zinc of one battery should be united by a wire with the copper of the next, and so on. In a few hours the solution in the larger vessel will have acquired sufficient silver, and the solution may be at once used. The porous cell is to be removed, and its contents may be thrown away.

In working this solution, at first it is necessary to expose a rather large surface of anode, and small quantities of cyanide must be added occasionally until the solution is in brisk working order.

This is one of the best solutions, when carefully prepared, and is less liable to strip than many others.

Solutions of silver may be prepared by precipitating the silver from the solution of nitrate with ammonia, soda, magnesia, etc., etc., but for all practical purposes the solutions 1, 4, 5, 6, and 7, may, if carefully prepared, be depended upon.

When it is desired that the articles should come out of the bath having a bright appearance,

a little bisulphuret of carbon is added to the solution. This is best done in the following manner: Put an ounce of bisulphuret of carbon into a pint bottle containing a strong silver solution with cyanide in excess. The bottle should be repeatedly shaken, and the mixture is ready for use in a few days. A few drops of this solution may be poured into the plating bath occasionally, until the work appears sufficiently bright. The bisulphuret solution, however, must be added with care, for an excess is apt to spoil the solution. In plating surfaces which cannot easily be scratch-brushed, this brightening process is serviceable. The operator, however, must never add too much at a time.

In making up any of the foregoing solutions, the weights and measures employed are troy, or apothecaries' weight, and imperial measure.

SILVER PLATING FLUID.—Dissolve 1 ounce of nitrate of silver in crystal, in 12 ounces of soft water, then dissolve in the water 2 ounces cyanuret of potash, shake the whole together, and let it stand till it becomes clear. Have ready some half ounce vials, and fill half full of Paris white, or fine whiting, and then fill up the bottles with the liquor, and it is ready for use. The whiting does not increase the coating power, it only helps to clean the articles, and to save the silver fluid, by half filling the bottles.

SILVERING POWDER.—For silvering copper, covering the worn parts of plated goods, etc.—1. Nitrate of silver, common salt, each 30 grs.; cream of tartar, $3\frac{1}{2}$ drs. Mix. Moisten with cold water and rub on the article to be silvered.—2. Pure silver (precipitated from the nitrate by copper), 20 grs.; cream of tartar, 2 drs.; salt, 2 drs.—3. Precipitated silver, $\frac{1}{2}$ oz.; common salt, sal ammoniac, each 2 oz.; corrosive sublimate, 1 dr. Make into a paste with water. Copper utensils are previously boiled with cream of tartar and alum, rubbed with this paste made red hot and afterwards polished.—4. Nitrate of silver, 1 part; cyanide of potassium, 3 parts; water enough to make a paste.

SILVER, To Refine.—Dissolve in nitric acid as in the case of the gold. When the silver has entirely disappeared, add to the two and a half ounces of solution nearly one quart of pure rain water. Sink, then, a sheet of clean copper into it—the silver will collect rapidly upon the copper, and you can scrape it off and melt into bulk at pleasure.

In the event you were refining gold in accordance with the foregoing formula, and the impurity was silver, the only steps necessary to save the latter would be to add the above named proportion of water to the solution poured from the gold, and then to proceed with your copper plate as just directed.

SILVER Tarnished in Soldering, To Clean.—Some expose to a uniform heat, as in the case of gold, and then boil in strong alum water. Others immerse for a considerable length of time in a liquid made of half an ounce of cyanuret potassa to one pint rain water, and then brush off with prepared chalk.

SILVER, To make Transparent.—Refined silver, one ounce; dissolve it in two ounces of aqua fortis; precipitate it with a pugil (a quantity that may be taken up between the thumb and finger) of salt, then strain it through a paper, and the remainder melt in a crucible for

about half an hour, and pour it out, and it will be transparent.

SILVER LEAF, To Varnish like Gold.—Fix the leaf on the subject, similar to gold leaf, by the interposition of proper glutinous matters; spread the varnish upon the piece with a pencil. When the first coat is dry wash the piece again and again with the varnish till the color appears sufficiently deep. What is called gilt-leather, and many picture-frames, have no other than this gilding; washing them with a little rectified spirit of wine affords a proof of this, the spirit dissolving the varnish, and leaving the silver-leaf of its own whiteness. For plain frames thick tin-foil may be used instead of silver. The tin-leaf, fixed on the piece with glue, is to be burnished, then polished with emery and a fine linen cloth, and afterwards with putty applied in the same manner; being then lacquered over with varnish 5 or 6 times, it looks very nearly like burnished gold. The same varnish, made with a less proportion of coloring materials, is applied also on works of brass, both for heightening the color of the metal to a resemblance with that of gold, and for preserving it from being tarnished by the air.

SILVER, To write on with a Black, that will never go off.—Take burnt lead and pulverize it. Incorporate it next with sulphur and vinegar, to the consistency of a painting color, and write with it on any silver plate. Let it dry, then present it to the fire so as to heat the work a little, and it is finished.

SPECULA, Polishing Powder for.—Prepare peroxide of iron, by precipitation, from a diluted solution of sulphate of iron with water of ammonia. Wash the precipitate, press it in a screw press until nearly dry, and expose it to a heat which in the dark appears a dull red.

SPRINGS (Trap), To Temper.—For tempering cast steel trap springs, all that is necessary is to heat them in the dark just that you may see it is red, then cool them in lukewarm water. The reason why darkness is required to temper springs is that a lower degree of heat can be seen in the night than by day-light; and the low heat and warm water give the desired temper.

SPRINGS of IRON WIRE.—After winding the wire around the mandrel, take the latter out and replace it with a rod of common rough iron, large enough to quite fill the spring, as after the spring has been cut off, it will unwind enough to increase the diameter considerably. Then take the rod with the spring on it, and heat to a cherry red, after which sprinkle it with prussiate of potash. Repeat this two or three times. After putting on the salt for the last time, heat again and plunge into cold water, and you will have a spring as brittle as glass. Then put oil on it, retaining the spring on the rod, and heat till the oil burns off with a blaze.

SOLDER, To Make Adhere to Brass or Copper.—Prepare a soldering solution in this way: Pour a small quantity of muriatic acid on some zinc filings, so as to completely cover the zinc. Let it stand about an hour, and then pour off the acid, to which add twice its amount of water. By first wetting the brass or copper with this preparation, the solder will readily adhere.

SOLDER, Common.—Put into a crucible 2 lbs. of lead, and when melted throw in 1 lb. of tin. This alloy is that generally known by the name of solder. When heated by a hot iron

and applied to tinned iron with powdered rosin, it acts as a cement or solder; it is also used to join leaden pipes, etc.

SOLDER, Hard.—Melt together 2 lbs. copper and 1 lb. tin.

SOLDER, Soft.—A strong, easily flowing and white solder is composed of lead one part, and tin 2 parts. When the lead is melted up put in the tin, and then throw in a small piece of resin as a flux. In soldering fine work, wet the parts to be joined with muriatic acid in which as much zinc has been dissolved as the acid will take up. It is cleaner than the old method of using Venetian turpentine or resin. A method of making silver solder: Put into a clean crucible pure silver two parts, clean brass one part, with a small piece of borax; melt and pour into ingot. Formerly the solder was returned to the crucible for a second melting, but it is not necessary. The solder flows easily and clean. Solder made from coin, as it frequently is, often melts with difficulty, and remains lumpy around the joints, requiring the use of the file to remove it, while the addition of any of the inferior metals to the solder causes it to eat into the article joined by it.

SOLDER (To Soft) Articles.—Moisten the parts to be united with soldering fluid; then, having joined them together, lay a small piece of solder upon the joint and hold over your lamp, or direct the blaze upon it with your blow-pipe until fusion is apparent. Withdraw then from the blaze immediately, as too much heat will render the solder brittle and unsatisfactory. When the parts to be joined can be made to spring or press against each other, it is best to place a thin piece of solder between them before exposing to the lamp.

Where two smooth surfaces are to be soldered one upon the other, you may make an excellent job by moistening them with the fluid, and then, having placed a sheet of tin foil between them, holding them pressed firmly together over your lamp till the foil melts. If the surfaces fit nicely a joint may be made in this way so close as to be almost imperceptible. The brightest looking lead which comes as a lining to tin boxes works better in the same way than tin foil.

SOLDER, Silver.—1. *Hardest.* Silver, 4 parts, copper, 1 part; fuse together. 2. *Hard.* Sterling silver, 3 parts, melt, add brass wire, 1 part. 3. *Soft.* Silver, 2 parts, melt, add brass wire, 1 part. This is generally used; some add a little arsenic, to make it whiter and more fusible, but it becomes less malleable, and more injurious. 4. Pure tin, or tin solder, (2 lead to 1 tin,) used for inferior works.

SOLDERING (Soft), Liquid for.—A liquid for soldering tin, iron, or copper with soft solder, is obtained when the solution of zinc in muriatic acid is gradually heated, and then a proportionate quantity of oxide or carbonate of tin in powder is added to neutralize the liquid. The same will not corrode the seams like that made of zinc and acid alone. For a fine job on tin, stearic acid obtained from the candle factories is much preferable to resin, etc., and will not run off so easily from the soldering iron.

SOLDERING FERRULES for Tool-Handles, etc.—Take your ferrule, lap round the joining a small piece of brass wire, then just wet the ferrule, scatter on the joining-ground, borax, put it on the end of a wire, hold it in the fire

till the brass fuses. It will fill up the joining, and form a perfect solder. It may afterwards be turned in the lathe.

STEEL, To Distinguish from Iron.—The principal characters by which steel may be distinguished from iron, are as follows:—

1. After being polished, steel appears of a whiter light gray hue, without the blue cast exhibited by iron. It also takes a higher polish.

2. The hardest steel, when not annealed, appears granulated, but dull, and without shining fibres.

3. When steeped in acids the harder the steel is, of a darker hue is its surface.

4. Steel is not so much inclined to rust as iron.

5. In general, steel has a greater specific gravity.

6. By being hardened and wrought, it may be rendered much more elastic than iron.

7. It is not attracted so strongly by the magnet, as soft iron. It likewise acquires magnetic properties more slowly, but retains them longer; for which reason, steel is used in making needles for compasses and artificial magnets.

8. Steel is ignited sooner, and fuses with less degree of heat than malleable iron, which can scarcely be made to fuse without the addition of powdered charcoal; by which it is converted into steel, and afterwards into crude iron.

9. Polished steel is sooner tinged by heat, and that with higher colors than iron.

10. In a calcining heat, it suffers less loss by burning than soft iron does in the same heat, and the same time. In calcination a light blue flame hovers over the steel, either with or without a sulphureous odor.

11. The scales of steel are harder and sharper than those of iron; and consequently more fit for polishing with.

12. In a white heat, when exposed to the blast of the bellows among the coals, it begins to sweat, wet, or melt, partly with light-colored and bright, and partly with red sparkles, but less crackling than those of iron. In a melting heat, too, it consumes faster.

13. In the sulphuric, nitric, and other acids, steel is violently attacked, but is longer in dissolving than iron. After maceration, according as it is softer or harder, it appears of a lighter or darker gray color; while iron on the other hand is white.

STEEL, Bessemer Process of Making.—Hematite pig-iron smelted with coke and hotblast has chiefly been used. The metal is melted in a reverberatory furnace, and is then run into a founder's ladle, and from thence it is transferred to the vessel in which its conversion into steel is to be effected. It is made of stout plate iron and lined with a powdered argillaceous stone found in this neighborhood below the coal, and known as ganister. The converting vessel is mounted on axes, which rest on stout iron standards, and by means of a wheel and handle it may be turned into any required position. There is an opening at the top for the inlet and pouring out of the metal, and at the lowest part are inserted 7 fireclay tuyeres, each having five openings in them; these openings communicate at one end with the interior of the vessel, and at the other end with a box called the tuyere-box, into which a current of air from a suitable blast engine is conveyed under a pressure of about 14 lbs. to

the square inch, a pressure more than sufficient to prevent the fluid metal from entering the tuyeres. Before commencing the first operation, the interior of the vessel is heated by coke, a blast through the tuyeres being used to urge the fire. When sufficiently heated, the vessel is turned upside down, and all the unburned coke is shaken out. The molten pig-iron is then run in from the ladle before referred to; the vessel, during the pouring in of the iron, is kept in such a position that the orifices of the tuyeres are at a higher level than the surface of the metal. When all the iron has run in the blast is turned on, and the vessel quickly moved round. The air then rushes upwards into fluid metal from each of the 35 small orifices of the tuyeres, producing a most violent agitation of the whole mass. The silicium, always present in greater or less quantities in pig-iron, is first attacked. It unites readily with the oxygen of the air, producing silicic acid; at the same time a small portion of the iron undergoes oxidation, hence a fluid silicate of the oxide of iron is formed, a little carbon being simultaneously eliminated. The heat is thus gradually increased until nearly the whole of the silicium is oxidized; this generally takes place in about 12 minutes from the commencement of the process. The carbon now begins to unite more freely with the oxygen of the air, producing at first a small flame, which rapidly increases, and in about three minutes from its first appearance we have a most intense combustion going on: the metal rises higher and higher in the vessel, sometimes occupying more than double its former space. The frothy liquid now presents an enormous surface to the action of the oxygen of the air, which unites rapidly with the carbon contained in the crude iron, and produces a most intense combustion, the whole, in fact, being a perfect mixture of metal and fire. The carbon is now eliminated so rapidly as to produce a series of harmless explosions, throwing out the fluid slags in great quantities, while the union of the gases is so perfect that a voluminous white flame rushes from the mouth of the vessel, illuminating the whole building, and indicating to the practiced eye the precise condition of the metal inside. The workman may thus leave off whenever the number of minutes he has been blowing and the appearance of the flame indicate the required quality of the metal. This is the mode preferred in working the process in Sweden. But here we prefer to blow the metal until the flame suddenly stops, which it does just on the approach of the metal to the condition of malleable iron: a small quantity of charcoal pig-iron, containing a known quantity of carbon, is then added, and steel is produced of any desired degree of carburization, the process having occupied about 28 minutes from the commencement. The vessel is then turned, and the fluid steel is run into the casting ladle, which is provided with a plug rod covered with loam: the rod passes over the top of the ladle, and works in guides on the outside of it, so that, by means of a lever handle, the workman may move it up and down as desired. The lower part of the plug, which occupies the interior of the ladle, has fitted to its lower end a fire-clay cone, which rests in a seating of the same material let into the bottom of the ladle, thus forming a cone valve, by means of which the fluid steel is run into different-sized moulds, as may be required.

the stream of fluid steel being prevented by the valve plug from flowing during the movement of the casting ladle from one mould to another. By tapping the metal from below, no scoria or other extraneous floating matters are allowed to pass into the mould.

STEEL, Heaton Process of Making.—This is essentially a direct method of producing steel chemically that bids fair to be of the very first importance, and almost to revolutionize that branch of industry. This, to express it in the fewest words, consists in pouring melted iron upon nitrate of soda in a cupola furnace, by means of which the oxygen developed from the nitrate combines with all the impurities—carbon, silicon, phosphorus, sulphur, etc.—which disappear, leaving the iron in the form of a crude steel, to be used in that form, or to be converted by a subsequent process into cast steel. The details of the process are as follows:

Cast iron of any quality (and this constitutes the chief advantage of the new process) is melted in a common iron cupola furnace, and a known quantity—from half a ton to a ton—is tapped out into an ordinary crane ladle, which is swung round to the side of the converter. This is a tall cylinder of boiler-plate iron, open at the bottom, and with a space between it and the floor. There is a fire-brick lining to the converter, and a conical covering, out of which an iron funnel opens into the atmosphere. In the bottom are placed a number of short cylindrical pots, lined with brick and fire-clay. Into the bottom of one of these pots is placed a given weight of crude nitrate of soda, the surface of which is leveled, and covered with a circular, perforated plate of thick cast iron. At the side of the cylinder is a hopper, covered by a loosely hinged flap of boiler-plate. This is raised, and the ladleful of cast iron is poured into the converter, descending upon the top of the perforated plate, which becomes gradually heated, and a reaction soon commences in the nitrate, resulting in the development of brown nitrous fumes, followed by blackish-gray and whitish fumes mixed with steam. In five or six minutes deflagration ensues, with a roaring noise, and the escape of a brilliant yellow flame from the top of the chimney, this lasting for a minute and a half, and then subsiding. The converter is then detached from the chimney, and the contents of the pot emptied on the iron pavement of the foundry, consisting of crude steel and of slag. The steel is in a pasty state, and the slag fluid, the cast iron plate melted up with the general mass.

The crude steel thus made is then broken up, and again heated on a balling furnace; afterward rolled or forged into suitable shapes. The material in this form is called "steel iron," and has qualities fully equal, for most purposes, to the Lowmoor iron. It welds perfectly, is neither "hot-short" nor "cold-short," and forges well at both a low red and clear yellow heat. To convert this again into cast steel, the cakes, after squeezing in the shingling hammer, are broken up and put into ordinary clay melting pots holding about 60 lbs. each. To 100 lbs. of the metal are added $2\frac{1}{2}$ or 3 lbs. of spiegeleisen, or its equivalent of oxide of manganese and charcoal, and the whole fused and cast into ingots. It is now cast steel, and from it bars can be produced in the usual way, fit for any required purpose.

STEEL, Siemens's.—The following is the process by which this steel is produced: Good hematite ore and spathic ore are mixed and treated with carbonaceous materials, by which their total or partial reduction into metallic iron is effected. This metallic iron is then subjected to very intense heat on the open hearth of a regenerative gas furnace, and in certain given quantities, or series of installments, is dropped into a bath of cast-iron previously prepared in the furnace. This operation is continued until the requisite degree of decarbonization is arrived at; and manganese is added in the form of ore or of spiegeleisen. The quantity of molten metal thus produced in one charge is about four tons. One ton of steel ingots may be produced with a ton and a half of cheap small coal. The ordinary Sheffield process requires from five to six tons of fuel for one ton of steel.

STEEL, Tempering.—Giving the proper degree of hardness to tools is a subject of deep interest to most of our readers, so that any light that may be imparted on the subject must be of more or less importance. For tempering many kinds of tools, the steel is first hardened by heating it to a cherry red, and plunging it into cold water. Afterward the temper is drawn by moderately heating the steel again. Different degrees of hardness are required for different purposes, and the degree of heat for each of these, with the corresponding color, will be found in the annexed table:

Very pale straw-color, 430°—the temper required for lancets.

A shade of darker yellow, 450°—for razors and surgical instruments.

Darker straw-yellow, 470°—for penknives.

Still darker yellow, 490°—chisels for cutting iron.

A brown yellow, 500°—axes and plane-irons.

Yellow, slightly tinged with purple, 520°—table-knives and watch-springs.

STEEL, To Color Blue.—The steel must be finely polished on its surface, and then exposed to a uniform degree of heat. Accordingly, there are three ways of coloring: First, by a flame producing no soot, as spirit of wine; secondly, by a hot plate of iron; and thirdly, by wood-ashes. As a very regular degree of heat is necessary, wood-ashes for fine work bears the preference. The work must be covered over with them, and carefully watched; when the color is sufficiently heightened, the work is perfect. This color is occasionally taken off with a very dilute muriatic acid.

STEEL, To Remove Bluing from.—Immerse in a pickle composed of equal parts muriatic acid and elixir vitriol. Rinse in pure water and dry in tissue paper.

STEEL, Scaling.—The scales on steel articles can be removed by pickling in water with a little sulphuric acid in it, and when the scale is loosened, brushing with sand and a stiff brush.

STEEL (Burnt), To Restore.—Borax, 3 oz.; sal-ammoniac, 8 oz.; prussiate of potash, 3 oz.; blue clay, 2 oz.; rosin, $1\frac{1}{4}$ lb.; water, 1 gill; alcohol, 1 gill. Put all on a fire, and simmer till it dries to a powder. The steel is to be heated, and dipped into this powder, and afterwards hammered.

STEEL, To Toughen.—Rosin 2 lbs.; tallow 2 lbs.; black pitch 1 lb.; melt together, and dip the steel in when hot.

STEEL GOODS, To Preserve.—Caoutchouc, 1 part; turpentine, 16 parts. Dissolve with a gentle heat, then add boiled oil, 8 parts. Mix by bringing them to the heat of boiling water; apply it to the steel with a brush, in the way of varnish. It may be removed when dry with turpentine. The oil may be wholly omitted.

STEAM BOILERS, To work without making smoke.—Smoke can not be consumed when once made, but it can be prevented by properly proportioned fire-grates, with due admission of air and careful firing, and without the need of expensive or patent apparatus. The subject may be clearly explained by a simple illustration. Petrolin or naphtha and such like compounds form the most smoky fuel; yet for a few pence lamps can be purchased which are familiar to all, which consume it without the least trace of smoke. The most simple cottager knows that his lamp never need smoke unless it is turned up too high. It smokes in that case because it is then worked beyond its power. Immediately it is turned lower, the lamp gives better light at a less cost and without waste. It is just the same with boiler and other fire-grates. When they smoke, it shows they are overworked. Lessen the quantity of fuel burned in each grate to the proper proportion, and keep the supply of fuel regular, and the smoke will cease, and the greatest economy will be received.

A bright and smokeless flame as well indicates that a large furnace is doing its proper and highest duty, as the bright flame shows the lamp to be in order. It is well that public bodies should insist on smoke being prevented as much as possible; but mischief and dissatisfaction result if the only way to satisfy complaint is by adopting some of the special apparatus. The true way to prevent smoke is to have sufficient boiler-room to generate the steam required sufficiently slowly to allow the combustion to be complete. There is greater economy in this than in futile efforts to force too small a boiler to do the required work with ruinous waste.

TEMPERING LIQUID.—1. To 6 quarts soft water put in corrosive sublimate, 1 oz.; common salt, 2 handfuls; when dissolved it is ready for use. The first gives toughness to the steel, while the latter gives the hardness. Be careful with this preparation, as it is a dangerous poison.—2. Salt, $\frac{1}{2}$ tea-cup; saltpetre, $\frac{1}{2}$ oz.; alum, pulverized, 1 tea-spoon; soft water, 1 gallon; never heat over a cherry red, nor draw any temper.—3. Saltpetre, sal-ammoniac, and alum, of each 2 oz.; salt, $1\frac{1}{2}$ lbs.; water, 3 gallons, and draw no temper.—4. Saltpetre and alum, each 2 oz.; sal-ammoniac, $\frac{1}{2}$ oz.; salt, $1\frac{1}{2}$ lbs.; soft water, 2 gallons. Heat to a cherry red, and plunge in, drawing no temper.

TESTING by Means of the Blowpipe.—Sulphuret of sodium is one of the best blowpipe tests, if used in the following manner: First, a bead is made with borax and the substance to be tested, and this bead, having been made very fluid within the reduction flame, there is added to it some dry and pulverized polysulphuret of sodium, and the bead again heated in the reduction flame. If the substance under investigation can form a sulpho-acid, there will be formed a soluble sulpho-salt and a clear bead; but when no such salt can be formed, with lead, for instance, an opaque bead will be formed. Iron, lead, bismuth, nickel, cobalt, palladium, thalli-

um, silver, copper, uranium, etc., fused in a bead of borax, to which, afterwards, sulphuret of sodium is added, will yield a black or brown colored opaque bead; zinc yields a white opaque bead; cadmium, while yet hot, scarlet red, and yellow after cooling; manganese, a dirty chestnut brown; gold and platinum, a clear, transparent, mahogany brown bead; tin, a clear, transparent, yellowish brown bead; chromium, a green bead; arsenic and antimony, colorless clear beads; vanadium and iridium, blood red beads; a slight excess of the sulphuret of sodium is required, and the bead should be heated carefully, but steadily, and with a good blast in the reduction flame.

TIERS ARGENT.—This alloy, generally supposed to consist of one-third silver and two-thirds nickel, has been analyzed recently by Dr. C. Winkler and found to be composed of silver, 27.56 parts; zinc, 9.57; nickel, 3.42; copper, 59.06; total, 99.61.

TINNING.—1. Plates or vessels of brass or copper, boiled with a solution of stannate of potassa, mixed with turnings of tin, become, in the course of a few minutes, covered with a firmly-attached layer of pure tin.—2. A similar effect is produced by boiling the articles with tin filings and caustic alkali, or cream of tartar. In the above way chemical vessels made of copper or brass may be easily and perfectly tinned.

TINNING by the Moist Way.—It is a well known fact that, when it is desirable to cover metals, especially brass or copper, with a strongly adhering coating of tin, this is usually effected by boiling the articles to be thus coated with an aqueous fluid, to which is added cream of tartar, crystallized protochloride of tin, and some lumps of pure metallic tin. The author states that, instead of this mixture, he uses, with very good success, a solution of one part of protochloride of tin in ten parts of water, to which he next adds a solution of two parts of caustic soda in twenty parts of water; the mixture becomes turbid, but this does not effect the tinning operation, which is effected by heating the objects to be tinned in this fluid, care being taken, at the same time, to place in the liquid a piece of perforated block-tin plate, and to stir up the fluid during the tinning with a rod of zinc.

TIN, To Crystallize.—Sulphuric acid, 4 oz.; soft water, 2 to 3 oz., according to strength of the acid; salt, $1\frac{1}{4}$ oz. Mix. Heat the tin hot over a stove, then with a sponge apply the mixture, then wash off directly with clean water. Dry the tin, and varnish with demar varnish.

TIN PLATE, Crystallized.—The figures are more or less beautiful and diversified, according to the degree of heat, and relative dilution of the acid. Place the tin-plate, slightly heated, over a tub of water, and rub its surface with a sponge dipped in a liquor composed of four parts of aquafortis, and two of distilled water, holding one part of common salt or sal ammoniac in solution. Whenever the crystalline spangles seem to be thoroughly brought out, the plate must be immersed in water, washed either with a feather or a little cotton (taking care not to rub off the film of tin that forms the feathering), forthwith dried with a low heat, and coated with a lacquer varnish, otherwise it loses its lustre in the air. If the whole surface is not plunged at once in cold water, but if it be partially cooled by sprinkling water on it, the crystallization will

be finely variegated with large and small figures. Similar results will be obtained by blowing cold air through a pipe on the tinned surface, while it is just passing from the fused to the solid state.

TIN CANS, Size of Sheet, for from 1 to 100 Gallons:—

For 1 gallon,	7 by 20 inches.
3½ "	10 by 28 "
5 "	12 by 40 "
6 "	14 by 40 "
10 "	20 by 42 "
15 "	30 by 42 "
25 "	30 by 56 "
40 "	36 by 63 "
50 "	40 by 70 "
75 "	40 by 84 "
100 "	40 by 98 "

This includes all the laps, seams, etc., which will be found sufficiently correct for all practical purposes.

TIN, Muriate of. (Tin Liquor).—Get at a tinner's shop, block tin; put it in a shovel, and melt it. After it is melted, pour it from the height of 4 or 5 feet into a pail of clear water. The object of this is to have the tin in small particles, so that the acid can dissolve it. Take it out of the water and dry it; then put it into a strong glass bottle; pour over it muriatic acid, 12 oz.; then slowly add sulphuric acid, 8 oz. The acid should be added about a table-spoon at a time, at intervals of 5 or 8 minutes; for if you add it too rapidly you run the risk of breaking the bottle by heat. After you have all the acid in, let the bottle stand until the ebullition subsides; then stop it up with a beeswax or glass stopper, and set it away; and it will keep good for a year or more, or will be fit for use in 24 hours.

TINWARE, To Mend.—Take a vial two-thirds full of muriatic acid, put into it all the shavings of sheet zinc it will dissolve, then put in a crumb of sal ammoniac, and fill up with water. Wet the place to be mended with this liquid, put a piece of zinc over the hole, and apply a spirit lamp or candle below it, which melts the solder on the tin, and causes the zinc to adhere.

TINNING Cast-Iron.—The iron is first well rubbed and cleaned in a bath of diluted sulphuric acid, then dipped in a solution of one part of sal ammoniac in seven parts of water. The tin used is alloyed with three ounces of copper for one hundred pounds of tin. The degree of temperature at which the melted tin will attach itself to the cleaned cast-iron objects must be found by experience. When too hot, it will not adhere well. The objects to be tinned must be very smooth, otherwise the tinning will not succeed; and in order to make the alloy with copper, it is best to melt the copper first with a few pounds of the tin, so that the higher temperature required to make this alloy may be more easily reached. When cast-iron objects have to be covered with a thick coating of tin—for instance, the inside of iron pots—they are first thoroughly cleaned, if possible, by grinding or turning, then heated to the melting point of the tin, then some of this tin is poured in with sal ammoniac, and this rubbed on the smooth surface with a piece of cork, and the excess of tin poured out. When covered with tin, in order to prevent this from draining off from the iron surface, and giving a coating of irregular thickness, before the pot is cold and the tin solidified, the outside of the pot

is plunged in cold water, which must not be allowed to get on the inside. In this way the tin coating may be obtained of a more uniform thickness.

TINNING (Cold) and Soldering.—This is done by means of an amalgam of tin and mercury. For tinning, it is made with so little mercury as to be soft and friable. The pieces to be tinned, even if of cast-iron, steel, or wrought-iron, are first thoroughly cleaned by filing, scraping, turning, rubbing with emery or sandpaper, or otherwise, without using any oil or fat, and then rubbed with a heavy rag, moistened with muriatic acid. A little of the amalgam is then rubbed on with the same rag, and if the cleaning was complete, the metal is found to be thoroughly coated.

Such pieces may then be soldered in the usual manner, with the common alloy of tin and lead; but for cold soldering, an alloy of tin and mercury is made, with more mercury than the above, so as to form a soft, pasty mass, which is placed between the tinned objects. The latter are pressed together to remove superfluous metal, and then set aside to harden.

In order to make a cold soldering joint between pieces of tin, lead, bismuth, or antimony, all that is required is pure mercury. Clean and amalgamate the surfaces to be joined, and place a few drops of mercury between; press together; remove the drops of mercury squeezed out; and put in an airy, warm place, to harden. The mercury will slowly disappear by evaporation, and leave the metal united.

TIN, Gold Lacquer for.—Alcohol in a flask ½ pt.; add gum shellac 1 oz.; turmeric ½ oz.; red-sanders ¼ oz. Set the flask in a warm place, shake frequently for 12 hours or more, then strain off the liquor, rinse the bottle and return it, corking tightly for use.

When this varnish is used, it must be applied to the work freely and flowing, or, if the work admits of it, it may be dipped into the varnish, and laid on the top of the stove to dry, which it will do very quickly; and they must not be rubbed or brushed while drying; or the article may be hot when applied. One or more coats may be laid on, as the color is required more or less light or deep. This is applied to lanterns, etc. If any of it should become thick from evaporation, at any time, thin it with alcohol. And by proper modifications, all the various colors are obtained.

TOMBAC, White.—When copper is combined with arsenic, by melting them together in a close crucible, and covering the surface with common salt to prevent oxidation, a white brittle alloy is formed.

TOMBAC, Red.—Put into a crucible 5½ lbs. of copper; when fused add ¼ lb. of zinc; these metals will combine, forming an alloy of a reddish color, but possessing more lustre than copper, and also greater durability.

TYPE METAL.—Lead 3 parts; antimony 1 part; melted together. Small types are usually made of a harder composition than large ones. A good stereotype metal is said to be made of lead 9 parts; antimony 2 do.; bismuth 1 do. This alloy expands as it cools, and consequently brings out a fine impression.

VARNISH for Iron.—The following is a method given by Mr. Weiskopf of producing upon iron a durable black shining varnish:

"Take oil of turpentine, add to it, drop by drop and while stirring, strong sulphuric acid until a syrupy precipitate is quite formed, and no more of it is produced on further addition of a drop of acid. The liquid is now repeatedly washed with water, every time refreshed after a good stirring until the water does not exhibit any more acid reaction on being tested with blue litmus paper. The precipitate is next brought upon a cloth filter, and, after all the water has run off, the syrupy mass is fit for use. This thickish magma is painted over the iron with a brush; if it happens to be too stiff, it is previously diluted with some oil of turpentine. Immediately after the iron has been so painted, the paint is burnt in by a gentle heat, and, after cooling, the black surface is rubbed over with a piece of woolen stuff dipped in, and moistened with linseed oil. According to the author, this varnish is not a simple covering of the surface, but it is chemically combined with the metal, and does not, therefore, wear off or peel off, as other paints and varnishes do, from iron."

VARNISH for Iron and Steel.—Dissolve 10 parts of clear grains of mastic, 5 parts of camphor, 15 parts of sandarac, and 5 of elemi, in a sufficient quantity of alcohol, and apply this varnish without heat. The articles will not only be preserved from rust, but the varnish will retain its transparency, and the metallic brilliancy of the articles will not be obscured.

VARNISH (Anti-Rust), for Iron and Steel.—Resin, 120 parts; sandarac, 180 parts; gum lac, 60 parts; essence of turpentine, 120 parts; rectified alcohol, 180 parts. Pound the first three ingredients, digest them by a regular heat until they are melted, and add the turpentine very gradually. After complete solution has taken place, add the alcohol, and filter through fine cloth or thick filtering-paper. The varnish should be kept in well-stoppered bottles.

VARNISH for Tools.—Take tallow, 2 oz.; rosin, 1 oz.; and melt together. Strain while hot to get rid of specks which are in the rosin; apply a slight coat on your tools with a brush, and it will keep off rust for any length of time.

VARNISH, Gold.—Turmeric, 1 dram; gamboge, 1 dram; turpentine, 2 pints; shellac, 5 oz.; sandarac, 5 oz.; dragon's blood, 8 drams; thin mastic varnish, 8 oz.; digest with occasional agitation for 14 days; then set aside to fine, and pour off the clear.

VARNISH (Black), for Coal Buckets.—Asphaltum, 1 lb.; lamp-black, $\frac{1}{4}$ lb.; rosin, $\frac{1}{2}$ lb.; spirits of turpentine, 1 quart. Dissolve the asphaltum and rosin in the turpentine; then rub up the lampblack with linseed oil, only sufficient to form a paste, and mix with the others. Apply with a brush.

WATCHES, To Clean.—It is hardly necessary to say that great caution must be observed in taking the watch down—that is, in separating its parts. If you are new at the business think before you act, and then act slowly. Take off the hands carefully so as not to bend the slender pivots upon which they work; this will be the first step. Second—loosen and lift the movement from the case. Third—remove the dial and dial wheels. Fourth—let down the main-spring by placing your bench key upon the arbor, or "winding post," and turning as though you were going to wind the watch until the click rests lightly upon the ratchet; then with your screw-

driver press the point of the click away from the teeth, and ease down the springs. Fifth—draw the screws (or pins) and remove the bridges of the train, or the upper plate, as the case may be. Sixth—take out the balance. Great care must be observed in this or you will injure the hair-spring. The stud or little square post into which the hair-spring is fastened may be removed from the bridge or plate of most modern watches, without unkeying the spring, by slipping a thin instrument, as the edge of a knife blade, under the corner of it and prying upward. This will save you a considerable amount of trouble, as you will not have the hair-spring to adjust when you reset the balance.

If the watch upon which you propose to work has an upper plate, as an American or English lever for instance, loosen the lever before you have entirely separated the plates, otherwise it will hang and most likely be broken.

Having the machine now down, brush the dust from its different parts and subject them to a careful examination with your eye-glass. Assure yourself that the teeth of the wheels and leaves of the pinions are all perfect and smooth; that the pivots are all straight, round and highly polished; that the holes through which they are to work, are not too large, and have not become oval in shape; that every jewel is smooth and perfectly sound; and that none of them are loose in their settings. See, also, that the escapement is not too deep or too shallow; that the lever or cylinder is perfect; that all the wheels have sufficient play to avoid friction, but not enough to derange their coming together properly; that none of them work against the pillar-plate; that the balance turns horizontally and does not rub; that the hair-spring is not bent or wrongly set so that the coils rub on each other, on the plate or on the balance; in short, that everything about the whole movement is just as reason would teach you it should be. If you find it otherwise, proceed to repair in accordance with a carefully weighed judgment, and the processes given elsewhere, after which clean—if not, the watch only needs to be cleaned, and therefore you may go ahead with your work at once.

Many watchmakers wet the pillar plates and bridges with saliva, and then dipping the brush into pulverized chalk or Spanish whiting, rub vigorously until they appear bright. This is not a good plan, as it tends to remove the plating and roughen the parts, and the chalk gets into the holes and damages them, or sticks around the edges of the wheel-beds. The best process is to simply blow your breath upon the plate or bridge to be cleaned, and then to use your brush with a little prepared chalk—(See recipe for preparing it.) The wheels and bridges should be held between the thumb and finger in a piece of soft paper while undergoing the process; otherwise the oil from the skin will prevent their becoming clean. The pinions may be cleaned by sinking them several times into a piece of pith, and the holes by turning a nicely shaped piece of pivot wood into them, first dry and afterwards oiled a very little with watch oil. When the holes pass through jewels you must work gently to avoid breaking them.

The oiling above named is all the watch will need. A great fault with many watchmakers lies in their use of too much oil.

Some watchmakers employ what they call the

"Chemical Process" to clean and remove discolorations from watch movements. It is as follows:—

Remove the screws and other steel parts; then dampen with a solution of oxalic acid and water. Let it remain a few moments, after which immerse in a solution made of one-fourth pound cyanuret potassa to one gallon rain water. Let remain about five minutes, and then rinse well with clean water, after which you may dry in sawdust, or with a brush and prepared chalk, as suits your convenience. This gives the work an excellent appearance, but I cannot say that it makes it any better than does the old process.

WATCH, Care of.—Always have a key with a good pipe or square, and one that fits properly on the square of your watch, for if it does not fit good and firm it will be apt to slip, often breaking either the chain, the ratchet, or the click. If the square of your watch is too short, or worn nearly round, get a watchmaker to repair it, or make a new one. Be particular to wind your watch the proper way. English watches, or those with fuzee and chain, usually wind to the left; and almost all the Swiss ones, or those with the going barrel, wind to the right. While being wound, the watch should be held steadily in one hand, so as to have no circular motion, which always produces variation in the vibration of the balance, and sometimes considerable derangement in the escapement. It is better to keep a watch continually going than to lay it by and wind it occasionally. The going of the watch keeps the oil in a limpid state, and the watch keeps its regulation better. Many will (when their watch is first wound up, after having lain by for some time,) say, "I have not wound or used it for so long." They do not consider that the oil will thicken or evaporate, and cannot be in the same state as if the watch was kept going regularly. Always wind steadily and slowly, holding on the key to hold the spring while the click slips from one tooth to the other, otherwise there is danger of breaking of chains, clicks, ratchets, etc. The click, chain or spring is sometimes broken by winding a watch too fast. When a watch stops in winding it, if in one with a chain, it is frequently by the going fuzee works not being correct. In a watch without a chain, it may also be by some defect in the escapement, or by the stop works on the barrel being out of order; in either case take it to a watchmaker.

Watches frequently stop by the springs breaking, owing to the changes of the atmosphere, particularly in cold weather. This is one of the accidents which cannot possibly be avoided by the best workmen, and in the very best watches. It is impossible to make a main spring which will not be influenced by the sudden changes of the weather. Therefore, if the spring of your watch breaks, do not blame the watchmaker, as they often break from the same cause while the watch is in his care.

Be not afraid that your watch will not go as well after a new spring has been put in as before; if a good new spring has been properly put in, your watch will go as well as ever.

English, or watches with chains, will usually wind about four and a half ($4\frac{1}{2}$) turns to every twenty-four hours, while those with a going barrel about three and a half ($3\frac{1}{2}$) turns; this will partly serve as a guide to ascertain if your watch winds right.

If the springs or chains break frequently, be sure there is some defect in the stop work, which must be corrected by a watchmaker.

Many persons say, "I have over-wound my watch;" it may be possible to do it in winding very fast, and in a hurry. If the stop works of a large and thick watch, or one with a chain, are in order, it will take a strong key to resist the strain that you can give to over-wind it. If not in order, the chain will break. In a flat watch, or one with a going barrel, if the stop works are not in order, or there is only one, or perhaps none, and you force it, you will break the spring, or some of the teeth of the wheels, or pinions, and sometimes both; if, when the spring is broken, you keep winding, you are likely to break or injure some other parts of the works.

Be particular never to trifle with a good watch, or use it as a toy, but as a piece of delicate and complicated mechanism, requiring great care; by so doing, you may preserve your watch, and avoid a great deal of expense for repairs.

Before winding or setting your watch, it is advisable to see that the key and the inside of the pipe contains no dirt or dust that may get on the winding or setting square, and from thence to the wheels or escapement.

When a watch is hung up, it should be perfectly at rest. If hung on a round hook without further support, the motion of the balance will generate a pendulous motion of the watch, and will cause much variation in the time. Powerful watches should never be laid horizontally, unless placed on a soft substance; if placed on a smooth flat surface, from the convexity of the glass or case, the watch only rests on a point, and the vibration of the balance alone is sufficient to produce motion in the watch.

Should a watch stop, see if the hands rub on the dial, and are free of each other; if they are caught together, you may free them yourself by taking the point of a small knife blade, and disengaging them; your watch, if there is nothing more the matter with it, will then start by giving it a slight shake.

Frequently, after a watch has had a new glass put in, it will stop; that is through the glass being too flat, and touching either on the center pinion, or by pressing on the hands; in that case, blame the person who put the glass in, and let him put another in; if there is not, as in very flat watches, room enough for the hands to work free of each other, it will often be advisable to have the cover of the case raised a little; in thin watches, the case may have been pressed flat in the center by wearing.

If anything is the matter with your watch, which you cannot discover immediately, do not try to put it in order yourself, and meddle with the works, but show it at once to a good watchmaker. I have had watches to repair in which the wearer thought he could detect the defect himself; in opening it, he would see the spiral spring, and think that it was some hair which had no business there, and in trying to remove it, would spoil or break it.

Many watches are injured by the wearers thinking that they can make them go by opening, winding, and shaking them.

Watches should be opened as little as possible, merely to wind, set, or regulate them. By continually opening them, particularly in the inside cap, opportunity is offered to minute part-

icles of dirt from the case, or otherwise, to intrude into the works.

Particular care should be taken to keep the works of a watch clean; even though perfectly free from dust, they ought to be taken to pieces and cleaned when the oil has become dry, as, without this precaution, the best watches would be spoiled. It is good watches that will continue to go, until friction and wear prevent their going any longer; they are the most liable to be neglected.

Watches, under ordinary circumstances, should be cleaned every second or third year at farthest. Those that are small and flat, or have complicated works, require cleaning more frequently. Neglect in this particular is the reason why many imported watches are injured by not being attended to in time, and having the oil changed. They may have been made some time previous to being sent out; then the journey here, then from the importers to the dealers, where they may lay for a long time before being sold; so that years may possibly elapse before the wearer has it in his pocket. Therefore, is it to be expected that the watch can perform correctly? If it does, all the time you keep it going, you are only causing it more injury.

No good watchmaker will allow a watch to go too long without changing the oil.

WATCH, Care of (Another Code of Directions).

1. Do not make a toy of it for yourself or the children. Never open it except for necessary purposes.

2. It should be regulated to about mean temperature, and always kept as near the same temperature as possible.

3. It should not be allowed to stop. Better that it be kept running all the time.

4. Keep it in as uniform a position as possible. If in the pocket, better that the pendant ring be upright.

5. Out of the pocket, if it hangs on the wall, let it be upon some soft surface. Never allow it to lie on bare marble or other hard surface. If it lie on any surface, let it be with face up and pendant ring turned under, so as to keep the upper part most elevated.

6. Let your key fit exactly, and be kept perfectly clean. By the former you may save breaking chains, mainsprings, ratchets, clicks, &c.; by the latter, prevent introducing much dust.

7. Wind, if possible, at the same hour each day.

8. While winding, hold your watch steadily in your left hand. Turn only your key, and that firmly, evenly, avoiding all quick motions or jerks.

9. Set your watch with a key; never turn the hands by any other way. You may turn the hands either way without danger, if they do not move very hard.

10. The hand of a pocket-chronometer or duplex watch should never be set backwards; in other watches this is a matter of no consequence whatever.

11. The glass should never be opened in watches that set and regulate at the back.

12. On regulating a watch, should it be going too fast, move the regulator a trifle toward the "slow", and if going slow, to the reverse; you cannot move the regulator too gently at a time, and the only inconvenience that can arise is,

that you may have to perform that duty more than once.

13. Take notice that your watch, even if a good one, will sometimes be guilty of "irregularities" in consequence of change of temperature, from the effects of which none but a chronometer is exempt; also from the jerks and jars of travel.

14. If you find any difficulty which you do not understand, go at once to a good watchmaker.

WATCH WHEELS, To Put Teeth into.—Most watchmakers solder or dovetail their teeth in, but there is a new mode which I consider far better, and I know it is easier: Make a hole through the plate of the wheel immediately below the point from which the tooth has been broken. Let its diameter be a little greater than the width of a tooth. Next, with your tooth-saw cut down where the tooth should stand till you come into the hole. You then dress out with a head upon it, a piece of brass wire, till it fits nicely into the cut of the saw, with its head in the hole. With a fine graver you then cut a crease into the wheel-plate above and below, on either side of the newly-fitted wire; after which, with your hammer, you cautiously spread the face of the wire until it fills the creases, and is securely clinched or riveted into the wheel. This makes a strong job, and one that dresses up to look as well as any other.

WATCH MOVEMENTS, To Frost.—Sink that part of the article to be frosted for a short time in a compound of nitric acid, muriatic acid and table salt—one ounce of each. On removing from the acid, place it in a shallow vessel containing enough sour beer to merely cover it, then with a fine scratch brush scour thoroughly, letting it remain under the beer during the operation. Next wash off, first in pure water and then in alcohol. Gild or silver in accordance with any recipe in the chapter on plating.

WELDING METALS, Philosophy of.—When two pieces of metal of any kind are to be united by welding, the surfaces of conjunction must be equally heated, and both surfaces must be brought to such a temperature that the particles will form a perfect continuity between the pieces united. This embraces the entire theory of welding, soldering, or brazing metallic substances of any kind. A poor weld, or an imperfect piece of brazing or soldering may always be attributed to the lack of skill on the part of the workman. In addition, however, to the equal and adequate heating of the surfaces to be united, every particle of coal-dust, cinders, or scales of oxide must be removed, so as to present two perfectly clean surfaces at the very moment when the union is to be effected. Furthermore, the piece of metal that would fuse at the lower temperature must be the guide, when bringing the surfaces of conjunction up to the proper heat. If, for example, two pieces of wrought-iron are to be welded, the part that will melt at the lower temperature must be brought just to a welding heat, and the surface of the other piece must be heated quite as hot, or a trifle hotter than the first piece. Then, if the surfaces be clean when the parts are brought together, the union will be satisfactorily complete. The degree of heat aimed at must be—not to produce a fluid—but simply to bring the metal into a condition between fluidity and plasticity.

When a soldering-iron, sufficiently hot to melt solder readily, is applied to a piece of solder on a sheet of clean tin, as the tin is so thin, the surface will be heated almost instantly as hot as the melted or half-fluid solder, and the resulting union will be perfect. But let the same soldering-iron and some of the same solder be employed in attempting to make solder adhere to a thick piece of lead pipe, and it will be found that it will not stick until the lead has been heated as hot as the solder. It is no difficult task to make solder adhere to a steel knife-blade, by simply cleaning the surface and applying a black-hot iron to a piece of solder laid on the clean metal, provided a little resin be sprinkled over the steel to prevent oxidation. But it is not possible to make solder stick to a thick piece of steel until the soldering-iron has been applied to the surface a sufficient length of time to heat the entire bar to a proper temperature. Solder will not adhere to a cold surface; neither can one piece of iron be welded to another that has not been brought up to such a degree of temperature that the particles of metal at the surface will unite.

WELDING by Pressure.—It is claimed that recent experiments by French machinists have shown that continued, steady hydraulic pressure in welding, causes complete union of two masses of iron, while the junction is only superficial if produced by the hammer. Among other experiments, two iron bars, one and a half inches in diameter, were heated to the welding point and brought under the hydraulic press. The welding was effected with extraordinary quickness, the fibres of the iron being thoroughly intercalated with each other, and the joined portion of the bars was quite as strong as anywhere else, a microscopic section of the joint showing a perfectly homogeneous texture.

WELDING (A New) Power.—The following composition, recently patented in Belgium, is said to be very useful for welding iron and steel together. It consists of one thousand parts of iron filings, five hundred parts of borax, fifty parts of balsam of copaiva or other resinous oil, with seventy-five parts of sal-ammoniac. Those ingredients are well mixed together, heated and pulverized. The process of welding is much the same as usual. The surfaces to be united are powdered with the composition, and then brought to a cherry-red heat, at which the powder melts, when the portions to be welded are taken from the fire and joined. If the pieces to be welded are too large to be both introduced at the same time into the forge, one can be first heated with the welding powder to a cherry-red heat, and the other afterwards to a white heat, after which the welding may be effected. Another composition for the same object consists of fifteen parts of borax, two parts of sal-ammoniac and two parts of cyanide of potassium. These constituents are dissolved in water, and the water itself afterwards evaporated at a low temperature.

WELDING CAST STEEL without Borax.—Copperas 2 oz.; saltpetre 1 oz.; common salt 6 oz.; black oxide of manganese 1 oz.; prussiate of potash 1 oz.; all pulverized and mixed with nice welding sand 3 lbs.; and use it the same as you would sand.

WELDING a small piece of Iron upon a large one.—It is often desirable to weld a bit of iron upon a large bar, when the large piece must be heated equally hot as the small one. To save

this: Take borax 1 lb.; red oxide of iron 1 to 2 oz.; melt them together in a crucible; and when cold, pulverize it and keep the powder dry for use. When you want to perform the operation, just bring the large piece to a white heat, having a good welding heat upon the small slip; take the large one from the fire, and sprinkle some of the powder upon the place, and bring the other upon it, applying the hammer smartly, and the weld will be as good as could be made with the greater heat without the powder.

WELDING COPPER.—In order to effect the welding of copper, it is necessary to remove the thin film of oxide of copper, formed in heating, from the surfaces which are intended to be united. This is done in a way similar to that employed in welding iron, by putting on a substance which is capable of dissolving the oxide of copper, and forming a thin fluid slag with it, the whole of which is squeezed out from between the two surfaces to be welded by the blows of the hammer or other pressure. The selection of the proper welding material was facilitated by the knowledge, acquired from mineralogy, that libethenite and phosphorocalcite, two phosphates of copper, smelt easily before the blow-pipe. It was to be inferred from this, that any salt which contained free phosphoric acid, or which would lose the same at high temperature, would be a proper medium for welding copper.

Mr. Ph. Rust made experiments several years ago for the purpose of determining the most effective and economical method of turning this knowledge to account. He employed first microcosmic salt, (phosphate of soda and ammonia,) which is so commonly used in blow-pipe experiments. The welding succeeded at once, and was very perfect. But as this salt has rather a high price, he substituted subsequently a mixture of 358 parts of phosphate of soda and 124 parts of boracic acid, which disengages, when heated, also phosphoric acid. The welding succeeded also; but in order to render the formed slag sufficiently fluid, a somewhat higher heat had to be given than in the first case.

The powder is put on to the surfaces to be united after the copper has been brought to a dull red heat; the metal is then heated a little more until a cherry-red is reached, and then at once brought under the hammer. As copper becomes very soft in the heat required for welding, the blows must be given very lightly and the ends to be welded must be previously considerably knocked up, in order not to distort the shape of the article beyond mending. A wooden hammer is, for this reason, preferable to an iron one.

Mr. Rust says, that it is especially important to guard against any pieces of coal, even the smallest spark, coming in contact with the liquid slag enveloping the ends to be welded. If this should happen, the phosphate of copper in the welding medium would at once be reduced to phosphide of copper, which would at once envelop the ends as a steel-gray film, and prevent the welding effectually. Only after a long treatment in an oxidizing flame, and repeated use of the welding medium, the union of the ends can be effected. For this reason it is preferable to use a gas-flame for the heating of the copper, if the pieces are not too large.

WIRE of SOLDER.—Take a ladle and bore a few holes in the bottom in a line with one

another, say six holes, about the size you want your wire. When you get ready to pour, have a strip of smooth iron or steel (a saw blade being very good), have your pierced ladle in your left hand, having previously heated it in the melted metal; then dip up some metal with an ordinary ladle with your right hand, and pour it through the pierced ladle, at the same time moving the two along the strip of iron, and a few inches above it. After you get the hang of it you can make very pretty wire, smaller or larger as you move fast or slow.

WROUGHT-IRON, To Case-Harden.—

To case-harden wrought-iron, take the prussiate of potash, finely pulverized, and roll the article in it, if its shape admits of it, if not, sprinkle the powder upon it freely, while the iron is hot.

This is applicable to iron axletrees, by heating the axletree and rolling the bottom of it in the powder, spread out for that purpose, turning it up quickly and pouring cold water upon it, getting it into the tub of cold water as quick as possible. They will wear for years, without showing wear.

MISCELLANEOUS.

AGUE, To Avoid.—The first suggestion, of course, is to leave those districts where this troublesome complaint prevails. Sometimes, however, one's residence cannot well be changed. To persons so circumstanced, there are preventions by the use of which the majority might generally escape it. They are as follows:—

1. Avoid exposing themselves to the malarial air after sunset and before sunrise.
2. Occupy rooms at night on the sunny side of the house and up stairs.
3. Build a fire in the house as soon as the dew begins to fall. The heat of the fire will do much to kill the malaria.
4. Keep the skin healthy and active by a thorough bath every day on rising, in a warm room, with sufficient friction to produce a healthy reaction.
5. Keep the bowels open by a proper diet. In nine cases out of ten the cause of ague would be easily overcome if the depurating organs were not overtaxed and morbid matters allowed to accumulate in the system to oppress it.

ALABASTER, To Harden and Polish.—

1. Take a strong solution of alum, strain it, and put it into a wooden trough sufficiently large to contain the figure, which must be suspended in it by means of a thread of silk; let it rest until a sufficient quantity of the salt is crystallized on the cast, then withdraw it, and polish it with a clean cloth and water.
2. Take white wax; melt it in a convenient vessel, and dip the cast or figure into it; withdraw and repeat the operation of dipping until the liquid wax rests upon the surface of the cast; then let it cool and dry, when it must be polished with a clean brush.

ALASKA ICEBERGS.—1. Alaska icebergs can be produced by making a saturated solution of plumbum nitras, then adding small, nice, white, and long pieces of ammonium chloride, and exposing undisturbed to the direct light of the sun for several days. Upon examination you will find formed beautifully white, opaque, needle-shaped crystals of chloride of lead representing the Alaska icebergs.—2. Over a concentrated solution of nitrate of lead, contained in a globe, is poured a solution of chloride of ammonium; this must be done carefully, so that the two fluids do not mix, when the formation of the Alaska iceberg will commence.

ANILINE COLORS, To make Soluble in Water.—The aniline colors insoluble in water may, according to Dr. Zinsman, who publishes

the process, be made to dissolve in that menstruum in the following way: A solution of gelatine in acetic acid of about the consistence of syrup is first made, and the aniline color in fine powder is gradually added, stirring all the time so as to make a homogeneous paste. The mixture is then to be heated over a water bath to the temperature of boiling water, and kept at that heat for some time. Colors in this state, if a very clear gelatine is employed, will be applicable to many decorative purposes. Bookbinders, paper-stainers, and printers will find them useful. They may also, we read, be used to color confectionery and soaps. Before they are used for confectionery, however, it will be well to make sure that no arsenic is present.

ATMOSPHERE, To Test the purity of.—

1. A simple method of ascertaining the presence of impurity (carbonic acid) in the atmosphere, is to nearly fill a glass tumbler with limewater, and to place it in any convenient position, as on the mantel-piece of a room. The rapidity with which a pellicle forms on its surface, or the water becomes cloudy, corresponds to the amount of the carbonic acid present in the atmosphere that surrounds it.—2. A little moist carbonate of lead put on a plate or saucer, and exposed in the same way, will turn black, should any sulphureted hydrogen be contained in the air. This is a very delicate test for that destructive gas.

AWNINGS, Mildew Proof.—As mildew is a parasitic plant, a fungus living at the expense of other organic matter, its prevention requires something destructive to vegetable life, and a kind of varnish to close the pores of the texture of the linen awning, to protect it against the chemical influences of the atmosphere and the penetration of the fine root filaments of the fungus, which has great vitality. Different varnishes will answer the purpose; we should prefer first to moisten the linen with a solution of arseniate of potash, which has the special property of preventing organic changes. After drying, put on a benzine varnish; perhaps one made of India rubber and benzole would be best. Carbolic acid is said to have the same effect, when the cloth is steeped in it; but it may discolor the canvas, and, moreover, it may be washed off by repeated rains.

AXLE-GREASE.—1. Water, 1 gal., soda, ½ lb., palm oil, 10 lbs.; mix by heat, and stir

till nearly cold.—2. Water, rape oil, of each 1 gal., soda, $\frac{1}{2}$ lb., palm oil, $\frac{1}{4}$ lb.—3. Water, 1 gal.; tallow, 3 lbs.; palm oil, 6 lbs.; soda, $\frac{1}{2}$ pound. Heat to 210° Fah., and stir until cool.—4. Tallow, 8 lbs., palm oil, 10 lbs., plumbago, 1 lb., make a good lubricator for wagon axles.

BALLOONS (Toy), Gas for.—Procure a glass jar with a tight fitting cover with a hole in the center. Fill two-thirds full of strips of good new zinc; put in enough water to cover this; then pour in enough sulphuric acid to make the water boil. Fasten the balloon tightly around the top of the jar so the gas cannot escape while generating.

BALLOON VARNISH.—Melt India rubber in small pieces, with its weight of boiled linseed oil, and thin it with oil of turpentine.

BAROMETER, Home Made.—1. Take a thin glass tube, 12 inches long and $\frac{1}{4}$ -inch in diameter, and fill three-fourths of it with two drachms of camphor, a half drachm of pure saltpetre, a half drachm of muriate of ammonia and two ounces of proof spirits. The tube may be tied over with bladder if required. As a sign of *fine* weather, the sediment of white flakes will settle near to the bottom of the tube, while the liquid will be quite transparent above. As a sign of *rain*, the matter will rise to the surface of the solution. At the approach of a *storm*, the matter will float on the surface of the solution in the form of white flakes, and the fluid will appear in a state of fermentation. During *frost*, the solution will present a starry appearance, and during *summer* or *hot weather* the matter will fall to the bottom as a solid substance.—2. Take a common phial, and cut off the rim and part of the neck, by means of a piece of cord passed round it, and moved rapidly to and fro, in a sawing direction; the one end being held in the left hand and the other fastened to any convenient object, while the right hand holds and moves the phial; when heated dip it suddenly into cold water, and the part will crack off; or separate it with a file. Then nearly fill the phial with clean water, place your finger on the mouth and invert it; withdraw your finger and suspend it in this position with a piece of twine. In dry weather the under surface of the water will be level with the neck of the bottle, or even concave; in damp weather, on the contrary, a drop will appear at the mouth and continue until it falls, and is then followed by another in the same way.—3. Take a common glass pickle bottle, wide mouthed, fill it within three inches of the top with water; then take a Florence oil flask, removing the straw covering and cleansing the flask thoroughly; plunge the neck of the flask into the other bottle as far as it will go, and the barometer is complete. In fine weather the water will rise into the neck of the flask, even higher than the mouth of the bottle. Before a heavy gale of wind the water has been seen to leave the flask altogether, at least eight hours before the gale came to its height.

BAROMETER, Animated.—1. Take an eight ounce phial, and put in it three gills of water, and place in it a healthy leech, changing the water in summer once a week, and in winter once in a fortnight, and it will most accurately prognosticate the weather. If the weather is to be fine, the leech lies motionless at the bottom of the glass and coiled together in a spiral form; if rain may be expected, it will creep up to the top of its

lodgings and remain there till the weather is settled; if we are to have wind, it will move through its habitation with amazing swiftness, and seldom goes to rest till it begins to blow hard; if a remarkable storm of thunder and rain is to succeed, it will lodge for some days before almost continually out of the water, and discover great uneasiness in violent throes and convulsive-like motions; in frost as in clear summer-like weather it lies constantly at the bottom; and in snow as in rainy weather it pitches its dwelling in the very mouth of the phial. The top should be covered over with a piece of muslin.—2. There is a frog in Wisconsin, who may fairly take his place among the frogs of history. He lives in a glass jar filled with water. A diminutive ladder runs from the bottom of the vessel to the top, and just above the water-line is a platform, on which his frog-ship is to be seen in fine weather sitting perfectly motionless as long as the dry season lasts. On the slightest indication of a change in the atmosphere he quits his perch and takes to the water, returning only at long intervals to feed upon the flies which are thrown to him. As he detects the approach of rain long before the most experienced human observer, his first dive is always the signal for taking in the clothes from the lines, and for getting out the umbrellas and goloshoes.

BASE BALL, To make.—A good base ball may be made by cutting an old boot or an old gum (rubber) shoe into strips and wrap them tightly around each other till it is about the size of a walnut. Then wrap with yarn or any kind of string very tightly, until it is the size you want it; then sew the loose end to the ball. Now lay the ball down on a piece of leather and gather up the sides and press them close to the ball and with a sharp knife trim off the corners, (be sure to have them fit nicely.) Now sew up all the sides except one; then slip in the ball, and sew up with a double thread. Now put some oil on the seams and hammer them smooth; for if you are not careful in catching a ball with rough seams, it will sometimes take the skin from the ends of the fingers.

BASKETS, To Crystallize.—Take a small basket, about the size of your hand, of iron wire or split willow; take some lamp cotton, untwist it, and wind it round every portion of the basket; then mix alum in the proportion of one pound to a quart of water, and boil till the alum is dissolved; pour the solution into a deep pan, and in the liquor suspend the basket without allowing any part to touch the pan, or to be exposed above the surface; let the whole remain properly at rest for twenty-four hours, when, if you take out the basket, the alum will be found prettily crystallized over all parts of the cottoned frame. After this first experiment, it will be easy to extend the crystallizing process to larger objects, and to adorn flowers with alum crystals of various colors.

BATHING, Sea.—There are circumstances necessarily connected with a visit to the sea-side, which greatly tend to increase its beneficial effects. In almost all instances the used up man of business or of pleasure, the man suffering from general debility, occasioned by his mental or physical powers having been overtaxed, or from continued residence in close, unhealthy towns, and persons suffering from general languor and lassitude, or undergoing difficult and

tedious convalescence from the effects of severe illness or accident, are benefited. To these people it is not the sea air alone, nor yet change of air; but it is change of scene and habit, with freedom from the anxieties and cares of study or business, the giddy rounds of pleasure, the monotony of every day life, or of the sick room and convalescent chamber, which produce such extraordinary beneficial effects—a seemingly perfect renovation of wasted energies and renewal of the powers of life—effects not to be obtained by means of any purely medical treatment.

With bathing in the open sea, there is to be considered, first, the shock experienced on entering water at its natural temperature, when shivering, convulsive respiration and oppression of the chest are always experienced, although but for a moment, and pass away on immersion at free action in the water; secondly, the stimulating effects of the saline substances; thirdly, the mechanical action and pressure of the large moving mass of water and the motion of the waves acting as douches, which, combined, are not in all cases well borne by delicate persons and children. The direct effect of cold bathing is sedative and benumbing, and causing the blood to recede from the surface of the body into the grand arterial trunks, congesting the brain and internal organs, depressing the vital powers, and as it were bringing on death. It is this direct effect we have to guard against, and this we can only do by encouraging sufficient and healthy reaction, indicated by the genial glow, feeling of general vigor, and increased appearance of blood to the surface of the body, sometimes wearing the aspect of a healthy skin, but at others exhibited by small red patches like measles, diffused redness as in scarlatina, or spots like flea bites. It is, therefore, how to avoid the direct evil effect, and how to encourage sufficient and healthy reaction, that we have to consider.

First, the duration of a cold bath should not be too prolonged, and it is to be laid down as an unexceptional rule, that a certain degree of vigor and power of reaction are essential in all by whom cold sea bathing is to be attempted. Thus it is not advisable that old people, the weak and delicate, including children, or such as are disposed to internal congestion or hemorrhage, should take a cold sea bath. General lassitude, with tendency to sleep, headache, or toothache, sensitiveness of the breast, increase of appetite, and constipation, are frequent results of a cold bath at the commencement of a course of sea bathing.

For bathing, therefore, in the open sea, it is desirable to prepare the delicate and unaccustomed by giving them a few preliminary tepid baths, which produce a gently stimulating action on the skin, acting at the same time as a sedative to the nervous system; and by gradually lowering the temperature of these baths, the patient becomes strengthened to undergo the shock of a cold bath without risk, the severity of which very rapidly becomes diminished by the force of habit in bathing. The latter part of the month of July is the most suitable time to commence a course of cold sea bathing, the delicate and invalided having been previously injured by tepid baths.

In the morning, before ten o'clock, the temperature of the sea is at its lowest, and it is, therefore, at this time unsuited to the uninvigorated and delicate, while it is most bracing and invigorating to the strong, and to such as can aid re-

action of the circulation by the exercise of swimming. The sea reaches its maximum temperature at twelve o'clock, and continues the same until five; it is, therefore, during this time the delicate should bathe, the earlier the better, but in this, of course, persons must be guided by the tide.

BEDROOMS, Ventilation of.—The importance of ventilating bedrooms is a fact in which everybody is vitally interested, and which few properly appreciate. If two men are to occupy a bedroom during a night, let them step upon weighing scales as they retire, and then again in the morning, and they will find that their actual weight is at least a pound less in the morning. Frequently there will be a loss of two or more pounds, and the average loss throughout the year will be more than one pound; that is, during the night there is a loss of a pound of matter, which has gone off from their bodies, partly from the lungs, and partly through the pores of the skin. The escaped material is carbonic acid and decayed animal matter, or poisonous exhalations.

BELTS, To Oil.—A good way to oil belts is to pour the oil on to the outside of the belt as it runs, and let the pulleys work it in. It may be put on freely if the belt be running idle, but if at work it will take but a small quantity at a time without slipping. Keep the leather just oily enough to make it pliable.

BLACKBOARDS, Artificial.—Blackboards or large writing slates are conveniences or necessities in nearly all schools. A recipe for preparing these, or a substitute, cheaply, is of general interest, and we are indebted for the following description to a gentleman of considerable experience. He says: I first have the place of the wall intended to be covered, surrounded by a narrow wooden molding, which may be covered by paint. Japan or varnish is necessary in the paint, as with benzine alone the lampblack rubs off; but as varnish makes the board too smooth to write on, I mix a little fine emery in it, to make it slightly gritty, like a slate; too much emery or a quality of too coarse a grade makes the removal of the chalk marks difficult. For the last purpose I take sheepskin with the wool on, nailed on a small piece of board and always used dry; it is much better than anything else. From time to time, however, the whole blackboard is cleaned with a wet sponge. The best substance for fixing the common lampblack and emery, is shellac dissolved in alcohol; the quantities are regulated by the circumstances. In warm weather it requires more alcohol. Too much shellac makes the solution too thick; too little causes it to come off. It is to be put on with a flat brush as rapidly as possible, as it dries at once. The blackboard may be used in less than half an hour.

BLACKBOARD PAINT.—To make one gallon of paint, take ten ounces pulverized pumice-stone, six ounces pulverized rotten-stone, three-quarters of a pound lampblack, and mix them with alcohol enough to make a thick paste. Grind the mixture very thoroughly in a paint-mill; then dissolve about fourteen ounces of shellac in the remainder of the gallon of alcohol. Now stir the whole together, and the paint is ready for use. The shellac prevents the paint from rubbing off. If the shellac is of poor quality, it will require a little more. When using, stir often to prevent the pumice-stone from

settling. In putting on a second coat, be careful not to rub off the first. One gallon will furnish two coats for sixty or seventy square yards of black-board, on walls not previously painted.

The surface of a plaster wall that is to be painted for the first time, may be somewhat improved by first putting on a coat of strong glue-sizing, prepared by boiling one pound of glue in a gallon of rain water. Stir in three or four ounces of lampblack. Put on hot.

BLACK HEALING SALVE.—Take of olive oil, 3 quarts; common resin, 3 oz.; bees-wax, 3 oz. Melt these articles together, and raise the oil almost to boiling heat; then gradually add of pulverized red lead two and a half pounds, if in the summer; if in winter, one-quarter of a pound less. In a short time after the lead is taken up by the oil, and the mixture becomes brown or a shining black; remove from the fire, and when nearly cold add of pulverized camphor half an ounce.

BLACK LUSTRE COLOR.—Dr. Kiemeier gives a recipe which is adapted for either paper, cloth, or porous wood. He states that it stands well, is very supple, and has no tendency to get sticky. To prepare it he boils together 8 pounds of glue, previously dissolved in 16 lbs. of water; 1 pound potato starch, dissolved in 5½ pounds of water; 5¼ pounds of campeachy, extract of 6° Baume; 1 pound 2 ounces of green vitriol, and 8¾ lbs. of brown glycerine. When thoroughly mixed, he removes the pot from the fire, and continues to stir until the liquid is cold. If the paint be desired thicker or thinner, the amount of starch and glue must be varied as well as the other materials, or the lustre will suffer.

BLADDERS, To Prepare.—Soak them for twenty-four hours in water, to which a little chloride of lime or potass has been added, then remove the extraneous membranes, wash them well in clean water and dry them.

BONES, To Whiten.—Put a handful of bran and quick-lime together, in a new pipkin, with a sufficient quantity of water, and boil it. In this put the bones, and boil them also till perfectly freed from greasy particles.

BONES, To Dye any Color.—Boil the bones first for a good while; then in a lye of quick-lime mixed with chamber-lye, put either verdigris, or red or blue chalk, or any other ingredient fit to procure the color you want to give to the bones. Lay the bones in the liquor, and boil them, they will be perfectly dyed.

BOOK-MAKING.—Title-Page.—The title-page, that heralds all the inner pages of a book, should be printed in a style of elegance severe and unadorned; no fancy type, except a line of Scribe Text or Old English—no Italics, unless perchance a single line motto in Pearl caps,—no bold-face type, nor Antique, nor Gothic,—but plain, clear, light-faced letters. All experienced printers incline to this simple style. Avoid having two lines of equal length to follow or come in contact with each other. Catch-words should be set on a very reduced scale, and proportioned according to strength of the preceding and succeeding lines, for bold catch-words detract from the general effect of the title. Authors should endeavor to make their title-pages as concise as possible, for a crowded title can never be displayed with elegance or taste.—*Preface.*—

Formerly, the preface was uniformly set in Italic; at present Roman is used, one size larger or smaller than the body of the work. If the work has been printed with folios only, then the preface should be paged in like manner.—*Contents.*—The contents follow the preface or introduction, and may be set either in Roman or Italic, generally two sizes smaller than the body of the work. The first line of each summary full, and the rest indented an em quadrat, with the referring figures justified at the ends of the respective lines.—*Dedication.*—The dedication generally follows the title, and seldom exceeds one page. It should be set in capitals and small capitals, neatly displayed. The name of the person to whom the work is dedicated should always be in capitals, and the terms, Your very humble and obedient, etc., should be in smaller type, and the signature or name of the author in capitals of a smaller size than that in which the name of the personage is printed to whom the book is dedicated.—*Index.*—The index is generally placed at the end of the volume, and set in type 2 sizes less than that of the work. It is always begun on an uneven page. In setting an index, the subject line should not be indented; but, if the article make more than one line, all but the first should be indented an em.—*Errata.*—The errata are put immediately before the body of the work, or at the end of it. They should consist only of such corrections as are indispensably necessary, without noticing any defects in the punctuation, unless where the sense is perverted.

BOOKS (School), To Preserve the Binding of.—The best way to preserve the binding of school books is to take the book and open it out flat, and mark the size exactly on the inner side of a piece of muslin, then cut it out; and then cut two pieces for the inner sides of the book a little less than the width; bind all three pieces separately all round with ribbon. Then sew the pieces together on three sides at each end of the long piece, leaving a space in the centre; turn the covers of the book back, and slip them into the muslin cover; and, if cut out well, it will fit as well as the original binding. Books so covered can be used for some years, and the binding will be found to be nearly perfect. It answers especially for children's school books, and the muslin is very easy to work, and looks well for a considerable length of time.

BOOK-COVERS (Leather), Marble for.—Wash the cover and glaire it, take a sponge charged with water, having the book between wands, and drop the water from the sponge on the different parts of the cover, sprinkle very fine with vinegar black, then with brown, and lastly with vitriol water. Observe to sprinkle on the colors immediately after each other, and to wash the cover over with a clean sponge and water.

BOOK-COVERS (Leather), Chinese Marble for.—Color the cover of the book dark brown, and when dry, put it into the cutting-press with the boards perfectly flat; mix whiting and water of a thick consistence and throw it on, in spots or streaks, some large and some small, which must remain till dry. Spot or sprinkle the cover with liquid blue, and lastly, throw on large spots of liquid red. The colors must be dry before washing off the whiting.

BOOK-COVERS (Leather), Green Marble for.—The edge must be marbled with a good

bright green only. When the color is prepared with the ox-gall, and ready for use, a few drops of sweet oil must be mixed therein, the color thrown on with a brush, in large spots, till the gum is perfectly covered. The oil will make a light edge round each spot, and have a good effect.

Blue, green, and brown may be also used separately in like manner.

Sheets of paper may be done, having a trough large enough, and the sheets damped as for printing, before marbling.

Spirits of turpentine may be sprinkled on the colors, which will make white spots.

BOOK-COVERS (Leather), Japan Coloring for.—After the book is covered and dry, color the cover with potash-water mixed with a little paste, give it two good coats of Brazil wash, and glaire it. Put the book between wands, allowing the boards to slope a little. Dash on copper-as-water, then with a sponge full of red liquid, press out on the back and on different parts, large drops, which will run down each board and make a fine shaded red. When the cover is dry, wash it over two or three times with Brazil wash to give it a brighter color.

BOOK-COVERS (Leather), Wax Marble for.—This marbling must be done on the fore-edge, before the back of the book is rounded, or becomes round, when in boards, and finished on the head and foot. Take beeswax and dissolve it over the fire in an earthen vessel; take quills stripped of their feathers, and tie them together; dip the quill-tops in the wax, and spot the edge, with large and small spots; take a sponge charged with blue, green, or red, and smear over the edge; when done, dash off the wax, and it will be marbled. This will be useful for stationery work, or for folios and quartos.

BOOKS, Chinese Edge for.—1. Color the edge with light liquid blue and dry; then take a sponge charged with vermilion, and dab on spots according to fancy: next throw on rice, and finish the edge with dark liquid blue.—2. Color light blue on different parts of the edge with a sponge; do the same where there are vacancies with yellow and Brazil red; dry and dab on a little vermilion in spots; then throw on rice and finish with a bold sprinkle of dark blue. Burnish.

BOOKS, To Marble.—This is performed by laying the color on the covers or edges with a brush, or by means of a wooden trough and gum water as follows:—Provide a wooden trough, 2 inches deep, 6 inches wide, and the length of a super-royal sheet; boil in a brass or copper pan any quantity of linseed and water until a thick mucilage is formed; strain it into the trough, and let it cool; then grind on a marble slab any of the following colors in small beer. For *blue*, Prussian blue or indigo;—*red*, rose-pink, vermilion, or drop lake;—*yellow*, king's yellow, yellow ochre, etc.;—*white*, flake white;—*black*, burnt ivory or lampblack;—*brunon*, umber, burnt do., terra di sienna, burnt do.; *black*, mixed with yellow or red, also makes brown;—*green*, blue and yellow mixed;—*orange*, red and yellow mixed;—*purple*, red and blue mixed. For each color you must have two cups, one for the color after grinding, the other to mix it with ox-gall, which must be used to thin the colors at discretion. If too much gall is used, the colors will spread; when they keep their place on the surface of the trough, when moved with a quill, they are fit for use. All things being in readi-

ness, the colors are successively sprinkled on the surface of the mucilage in the trough with a brush, and are waved or drawn about with a quill or stick, according to taste. When the design is thus formed, the book, tied tightly between cutting boards of the same size, is lightly pressed with its edge on the surface of the liquid pattern, and then withdrawn and dried. The covers may be marbled in the same way, only letting the liquid colors run over them. The film of color in the trough may be as thin as possible, and if any remains after the marbling it may be taken off by applying paper to it before you prepare for marbling again. This process has been called French Marbling.

To diversify the effect, colors are often mixed with a little sweet oil before sprinkling them on, by which means a light halo or circle appears round each spot. In like manner, spirits of turpentine, sprinkled on the surface of the trough, will make white spots. By staining the book covers with any of the liquid dyes, and then dropping on them, or running over them, drops of liquid mordants, a very pleasing effect may be produced. Thus vinegar black, or a solution of green copperas, let fall or run over common leather, produces black spots or streaks, and gives a similar effect with most of the light dyes. A solution of alum or tin in like manner produces bright spots or streaks, and soda and potash water dark ones. This style has been called *Egyptian marble*.—*Soap marbling* is done by throwing on the colors, ground with a little white soap to a pliable consistence, by means of a brush. It is much used for book edges, stationery, sheets of paper, ladies' fancy work, etc.—*Thread marble* is given by first covering the edge uniformly of one color, then laying pieces of thick thread irregularly on different parts of it, and giving it a fine dark sprinkle. When well managed the effect is very pleasing.—*Rice marble* is given in a similar way to the last by using rice.—*Tree marble* is done on leather, book covers, etc., by bending the board a little in the centre, and running the marbling liquid over it in the form of vegetation. The knots are given by rubbing the end of a candle on those parts of the cover.—*Wax marble* is given in a similar way to thread marble, but using melted wax, which is removed after the book is sprinkled and dried, or a sponge charged with blue, green, or red, may be passed over. This is much used for stationery work, especially folios and quartos. The *vinegar black* of the bookbinders is merely a solution of acetate of iron, made by steeping rusty nails or iron filings in vinegar. All the ordinary liquid colors that do not contain strong acids or alkalis may be used, either alone or thickened with a little gum, for marbling or sprinkling books.

BOOKS, To Gild the Edges of.—The edges of the leaves of books and letter paper are gilded whilst in a horizontal position in the bookbinder's press, by first applying a composition formed of four parts of Armenian bole, and one of candied sugar, ground together with water to a proper consistence, and laid on by a brush, with the white of an egg. This coating, when nearly dry, is smoothed by the burnisher, which is generally a crooked piece of agate, very smooth, and fixed in a handle. It is then slightly moistened by a sponge dipped in clean water, and squeezed in the hand. The gold-leaf is now taken upon a

piece of cotton from the leathern cushion, and applied on the moistened surface. When dry it is to be burnished by rubbing the agate over it repeatedly from end to end, taking care not to wound the surface by the point of the burnisher. A piece of silk or India-paper is usually interposed between the gold and the burnisher.

Cotton-wool is generally used by bookbinders to take the leaf up from the cushion, being the best adapted for the purpose on account of its pliability, smoothness, softness, and slight moistness.

BOOKS, Gilt Lettering on the Backs of.—The place on those parts of the book which is to receive the letters is moistened with a little albumen. The letters or type are then pressed on a piece of gold leaf, when the adhering gold is transferred to the back of the book by pressing the type on the moistened spot. Superfluous particles of gold are removed by blowing or by means of a soft brush. After the lettering is finished, the book must dry for a day before it is used.

BOOK-MOTHS.—Literary people are occasionally annoyed by the depredations of minute insects, which feed luxuriously on their fine books, manuscripts and pamphlets. They are popularly known as book-moths. They appear to be in search of the paste, glue, and sizing which are used by the binders. However old and dry the books may be, if the room in which they are kept, or the cases in which they are arranged, are slightly damp, it softens the old glue or size by imbibition, just the condition required by the invaders. In gnawing it from the paper surface into which it originally penetrated, they also destroy the texture of the leaves, so that costly works are quite ruined. There is no better remedy than placing the books at once in a dry room where the moisture evaporates; and if the sunlight acts upon the windows daily, so much the better. The moths disappear when the paste becomes too hard for them. Or rather their activity is suspended, to be revived on again removing the books into a damp apartment. Russian binding is so offensive to them that they cannot attack books in Russia leather binding. It is not, perhaps, so generally known as it deserves to be, that a few drops of any kind of perfumed oil will secure books and manuscripts from the deteriorating effects of mould and damp.

BOOKS, To Sprinkle the Edges of.—The brushes used for book-edges must be made of Russia hogs' bristles, of good thickness, tied round with cord, glued at the thick end, and half covered with a piece of leather; when dry tie the brush again with waxed cord, within half an inch of the soft part of it, and cut it very smooth and even. Brushes made after this manner are preferable to those with a handle.

Prepare the color in a cup; dip in the brush till it is charged, and then press it out till it will drop no longer. The book must be screwed tight in the cutting press; hold the brush in the left hand, and, with a folding-stick in the right, rub it over the brush, which will cause the color to sprinkle finely on the edges. The brush must be moved up and down over the edge, as you sprinkle, to have it regular on every part. After the sprinkling is done, the brushes should be carefully washed in water, particularly after sprinkling blue, which will otherwise soon de-

stroy the brush.—*Green.*—1. Yellow the edge, then sprinkle with dark blue.—2. French berries, 1 part; soft water, 8 parts. Boil and add a little powdered alum; then bring it to the required shade of green, by adding liquid blue.—*Gold.*—Put into a marble mortar half an ounce of pure honey and one book of gold leaf, run them well together until they are very fine, add half a pint of clear water, and mix them well together; when the water clears, pour it off, and put in more, till the honey is all extracted, and nothing remains but the gold. Mix one grain of corrosive sublimate in a teaspoonful of spirits of wine, and when dissolved, put the same, together with a little gum-water, to the gold, and bottle it close for use. The edges of the book may be sprinkled or colored very dark, with green, blue, or purple, and lastly, with the gold liquid, in small or large spots, very regular, shaking the bottle before using. Burnish the edges when dry, and cover them with paper to prevent the dust falling thereon. This sprinkle will have a most beautiful appearance on extra work; ladies may use it for ornamenting their fancy work, by putting it on with a pen or camel's-hair brush, and when dry burnish it with a dog's tooth.—*Purple.*—1. Logwood chips, 4 parts; powdered alum, 1 part; soft water, 24 parts. Boil until reduced to 16 parts, and bottle for use.—2. Brazil dust (fine), and mix it with potash water for use.—*Red.*—Brazil-wood (ground), 4 parts; alum, 1 part; vinegar, 4 parts; water, 4 parts. Boil until reduced to 7 parts, then add a small quantity of loaf-sugar and gum. Bottle for use.

BOOKBINDERS' VARNISH.—5 ounces of shellac are to be dissolved in one quart of rectified spirits of wine; add 10 oz. of burned and recently heated animal charcoal, boil a few minutes, subtract a little of the liquid, and see if it is colorless; if not, add a little more charcoal. When colorless, strain through silk, and afterward filter through blotting paper; if wanted perfectly pure, strain when cold.

BRASS, To Clean.—Take one tablespoonful of oxalic acid, and one half pint soft water, and then add a small package of tripoli (such as you buy for ten or twenty cents), or, say two good tablespoonfuls. This will bring a beautiful polish. Allow the mixture to remain on a few minutes, and wipe off with dry waste or woollen rag.

BUILDING, Fallacies in.—To suppose that timber, growing in the woods or floating in water to-day, can be placed in a building next week, and stay where it is put.

That if such timber be used, the walls will not crack.

That the base, window panels, casings, etc., made of such timber will not part company with the floors from one-fourth to three-fourths of an inch in less than a year, and that the builder put unseasoned lumber in the latter.

That kiln-dried lumber is as good as lumber thoroughly air-seasoned, or that the atmosphere has no influence upon it.

That a joint once tight will always remain so. That if trimmings be put up before plastering, or trimmed on green walls, that putty will not be in great demand when they dry.

That hot air from a furnace will not start and open every piece of wood-work with which it comes in contact, nine times out of ten.

That if partitions be not properly braced, bridged, and secured at angles, that plastering will not crack.

That ceilings are less likely to crack if cross furred.

That a pailful of lime to a cartload of sand will make mortar of any practical use, either for plastering or brick work.

That it injures mortar by mixing it some time before using it, or that if mixed one day and applied the next, it won't blister and crack.

That a cement roof, so soft that it fills the leaders in summer, or so hard it cracks in winter, will not occasion the want of new ceilings in a little time.

That a "botch" can build as good a building as a thorough mechanic.

That in all cases money is saved by contracting with the lowest bidder.

That all knowledge in relation to building is embodied in every one who signs "Architect" after his name.

That architects and builders never "lay in together", and owners never get "shorn" through that little arrangement.

That architects, as a rule, get no other commissions on buildings except the traditional "five per cent. on the cost."

That builders always carry out plans and specifications to the letter.

That there are no high minded, conscientious, competent architects, and no honest, reliable builders; and that either class does not bear a reputation equal to that of any other business men.

That a builder does not require an extended theoretical, nor an architect an extended a practical knowledge, to be successful.

That no builder can be a successful architect, or that a practical architect cannot be a successful builder.

BUILDING MATERIAL, Strength of.—Experiments are sometimes made in regard to the power of stones of different kinds to resist compression, by cutting one cubic inch off each, placing it between two steel plates, and charging it with increasing weight till crushed. For convenience' sake, this weight is applied by means of a lever, so as to obviate the necessity of actually handling the hundreds and thousands of pounds—one or more sliding weights on a strong beam being sufficient for these experiments. The results are indicated in the following table, in which the number of pounds is that of which the substance could bear the pressure, while it was crushed by the addition of more:

Table of resistance of a cubic inch of divers building stones against crushing pressure

Name of Stone.	Where used or wherefore.	Weight applied in Pounds
Inferior pale brick	For filling walls	2,000
Common good brick	" partition walls.....	4,000
Hard brick	" floors.....	4,500
Pressed Phila. brick	" fronts of houses....	5,000
Sandstone from Acquia Creek, strata laid vertical.....	Many public buildings, Washington.....	5,500
Marble, Baltimore, (large crystal).....	House trimmings, Baltimore.....	8,000
Sandstone, Acquia Crk, (strata laid horizontal).....	Public buildings, Washington.....	8,300
Marble, Montgomery Co., Pa.....	House-fronts, door-sills, etc., Philadelphia.....	8,900

Name of Stone.	Where used or wherefore.	Weight applied in Pounds
Marble, Lymington, (strata vertical).....	National Washington Monument.....	9,100
Marble, same, (strata horizontal).....	National Washington Monument.....	10,100
Marble, Stockbridge.....	City Hall, New York City	10,400
Sandstone, Seneca.....	Smithsonian Institute, Washington	10,800
Marble, Lymington, (large crystal).....	National Washington Monument.....	11,100
Granite, Patapsco.....		11,200
Marble, Italian.....	Statuary.....	12,600
Marble, Baltimore, (small crystal).....		18,000
Marble, Lymington, (small crystal).....	Washington Monument	18,200
Marble, Hastings, N.Y.	{ University Build'g, New-York..... }	19,000
Gneiss, Palisades, near New-York.....	Pavements.....	19,700
Marble, Lee, Mass.....	Housefronts, Boston etc.	22,700
" East-Chester ..	Post-Office, Washington	23,900
Granite, Dry Island, Maine.....	{ New Post-Office, N. Y. Extension of Treasury, Washington }	24,000

BURNING LENS, Cheap and Simple.

Take two circular discs of plate glass, of the requisite dimensions, and place one at each end of a shallow tube; an inch long will be quite sufficient for any size; they are kept in their position very firmly by means of screw clamps, in an analogous manner to the two lenses for showing Newton's concentric colored rings. To the tube is fitted a short tube with a stop-cock attached; to the end of this tube a condensing syringe is fixed, and the cavity between the glasses filled with turpentine, varnish, bleached oil, or any other suitable substance of a high refractive power. When the glasses have attained the requisite degree of curvature, the stopcock may be shut, the syringe screwed off, and the fluid lens (for such in reality it is) mounted for use.

BUTTER, To Restore when Rancid.—Pack the rancid butter in a firkin; and then take a barrel, put in about one bushel of charcoal, set the firkin of butter inside the barrel, and cover with good brine, letting it stand three or four weeks. This will restore it unless it be very bad. See also page 124.

BUTTERFLIES, To Prepare for Collections.—The first thing to be procured is the butterfly-net, which is a bag made out of two pieces of musquito-netting—blue is the best—about two feet deep, tapering towards the bottom, and fastened to a piece of stout wire bent into a circle of about a foot in diameter, the two ends of which are fastened into a light but strong stick three or four feet in length.

The next requisite is something to kill them with. Chloroform is best, but in default of that ether will do. It should be applied to the head of the butterfly with a small camel's hair brush.

Then come the pins. They should be long and slender; real butterfly pins are best, but very fine common ones will do. Then you must have a pasteboard box to put the butterflies in when you catch them to bring them home.

The cases are the last thing to be thought of. The frame of the case should be very much like a picture frame, deep enough for the pins to go in, with the back, on which the butterflies are fastened, so arranged as to come out, being held in place by little cleats, and a plate of glass fixed

securely on the front. It should be made of soft wood, so that the pins can stick in easily. The size of the case depends upon the taste of the collector.

"Stretching" a butterfly is the process of keeping its wings in the natural position when at rest. You should have a board with grooves in it wide enough to admit the body of the butterfly or moth, with little pieces of cork fastened on it to stick the pins into. Then take some narrow strips of soft paper, press the wings of the butterfly down with them as nearly in the natural position as possible, and fasten them with pins. In a few days the butterfly will be dry enough so you can take the papers off and put it in the case.

CANVAS, To Make Water Proof.—White lead 4 pounds, spirits of turpentine 1 fourth part, white vitriol half ounce, sugar of lead half ounce, and boiled oil to make it thin, apply with a paint brush to the canvas or linen, which must be well washed to take out the stiffening; well dried and stretched tight on a frame while being painted.

CAOUTCHOUC for Printing-Ink Rollers.—In order to give to vulcanized caoutchouc all that softness which is requisite, for instance, for printing-ink rollers, M. Mouton reduces ordinary vulcanized caoutchouc to powder, places it in suitably shaped vessels, and submits it a second time to the temperature required for vulcanization. By this means it is rendered soft and smooth, has entirely lost its usual harshness, and is fit for various uses—among these the making of durable printing-ink rollers.

CARBONIC ACID, To Make.—Pour muriatic acid upon fragments of chalk or marble. The gas being heavy may be collected without the use of water, by simply allowing the delivery tube to pass to the bottom of the receiving vessel.

CASTOR OIL, Mechanical uses of.—It is not as universally known as it deserves to be, that castor oil is as useful in the trades as it is in medicine. It is much better to soften and redeem old leather than any other oil known. When boots and shoes are greased with it, the oil will not at all interfere with the polishing afterwards, as in the case with lard, olive, or any other kind of oil. In Harrisburg, the old leather hose of some of the fire companies were greased with it, and found to become almost as soft and flexible as new leather. Leather belts for transmitting motion in machinery will usually last three to five years, according to the wear and tear they are exposed to; when greased with castor oil they will last ten years or more, as they always remain flexible and do not crack. Besides this advantage, castor oil prevents slipping, so that a belt three inches wide, impregnated with it, will be equal to a belt four and a half inches wide without castor oil. It is necessary, however, to wait twenty-four hours till the oil has disappeared from the surface and penetrated the leather, otherwise the freshly greased surface will cause slipping. Another advantage of castor oil is that rats and other vermin detest anything impregnated with castor oil, and will not touch it.

CASTING in Plaster.—Obtain some fine plaster of good color, and pass it through a muslin sieve, to remove any coarser particles which may be present. By mixing gum-arabic with

the water intended to be used in the plaster, not only will the plaster be rendered very hard when it sets, but a beautiful gloss will be given to the surface. Care must be taken to drop the plaster powder gradually into the water, and to permit the bubbles to rise before the mixture is stirred; otherwise it will become lumpy. The plaster should be of the consistence of the yolk of an egg, and of course used immediately. If the medal intended to be copied is a valuable one, with a smooth surface, it will be advisable not to oil it, as, in cleaning the oil off, the polish may be injured; but if the surface be rough, there will be no remedy, and the oil must afterwards be removed by dabbing the surface of the metal gently with a soft cloth. A rim of thin lead, brass, copper, or even oiled paper, is then tied around the medal, and some liquid plaster, in the first place, stippled over its surface with a soft brush, to prevent the formation of air-bubbles, as well as to insure its insertion into the most minute crevices; after which the plaster is poured upon the surface to the thickness of half an inch, or an inch if a large medal. To cause the separation of the mold from the metal, all we have to do is to immerse it in water, when it is readily removed; otherwise the mold is sure to be broken. To obtain a plaster cast from this mold, we must oil it with warm boiled linseed oil, and allow it several days to dry. Whenever the mold is used, it must be well oiled, otherwise the surface of the castings will be destroyed. The best olive oil must be used, or the color of the plaster will be injured.

CASTING in Wax.—The mold is first made in plaster; but before being used is placed in warm water, of which it is allowed to absorb as much as it will take—oil not being used in this process. The surface must then be allowed to dry, or the wax would not adhere closely. Pure wax is too greasy for the purpose, and bladder flake-white is therefore mixed with it. The quantity can not be stated, but the addition of too much gives wax the appearance of plaster, by taking away its richness. If the wax is often remelted, its color is injured. In order to obtain a gray marble color, a marble powder, procurable of any statuary, is mixed with the wax, which not only gives a beautiful appearance to it, but renders it more durable. The wax is poured into the mold, and allowed to flow over its surface, and by moistening the plaster mold in water when the wax has become hard, the cast is easily removed. Wax models may be fastened by means of boiled linseed oil and flake-white, and also by a combination of beeswax and resin.

CASTING in Sulphur.—This is a very permanent mode; but as a mold it can only be used for plaster, for hot wax or sulphur would injure its surface. When sulphur is heated to the temperature suitable for forming casts it becomes nearly black, and has, therefore, to be covered with vermilion in the proportion of one ounce of vermilion to three of sulphur. The surface of the mold, however, need only be coated with this expensive mixture, and common sulphur added in any quantity. You must use wood to stir the sulphur, as iron will take away its color. The sulphur will take fire in melting unless it is properly stirred, and at first will become thick and viscid; but by continuing the application of heat it will again assume a perfectly liquid form.

CASTING in Glue.—If a medal is so much sunk and engraved that you can not get a plaster cast off, a mold may be obtained by pouring glue upon it. In this manner a bunch of grapes can be taken in the natural state, and by cutting the glue down the center, the grapes can be extracted, and the molds used to produce a representation of the original in plaster. Isinglass may be similarly used, but it is first mixed with flake-white in the state of powder.

CASTING in Bread Paste.—Take the inside of a penny roll and work it well up with vermilion, the longer the better, until it becomes viscid and tough; it is then to be worked well into the mold. After having obtained the mold, it must be fastened down upon a piece of wood by wetting it, so as to prevent it from warping as it dries. After it has been thoroughly dried, you may oil it, and then obtain as many casts as you please from it in plaster, wax, or sulphur. By means of bread paste, a traveler may always take a mold of any small object of interest he meets with on his journey, and thus a proper knowledge of its mode of use becomes invaluable.

CEMENTS, Colored.—A writer in *Comptes Rendus* states that colored cements which harden rapidly may be made as follows: He takes a solution of silicate of soda (sp. gr., 1.298) and adds to it, while stirring, first pulverized and previously washed, lixiviated chalk, so as to form a thick mass, like butter, to which are added, for coloring purposes, the following substances: Finely pulverized sulphuret of antimony for black, iron filings for gray, zinc dust for whitish gray, carbonate of copper for bright green, oxide of chromium for deep green, cobalt blue for blue, red lead for orange, vermilion for bright red, and carmine for a violet hue. This cement hardens within from six to eight hours, and may afterward be polished, becoming like marble.

CEMENT for either Leather or Rubber Straps.—Gutta percha, 16 oz.; India rubber, 4 oz.; pitch, 2 oz.; linseed oil, 2 oz. Cut the rubber in shreds and add the oil, which in a few days will have softened the former. Melt carefully the gutta percha and pitch together, and stir in the rubber solution, or paste, apply hot, and press joints.

CHAIRS.—An eminent physician, speaking of chairs, remarks that they are too high and too nearly horizontal. We slide forward, and our spines ache. The seats should be fifteen or sixteen inches high in the front for men, and from eight to fourteen inches for children and women. The back part of the seat should be from one to three inches lower than the front part. This last is very important. The depth of the seat from front to back should be the same as the height. The chair back is likewise unphilosophical. The part which meets the small of the back should project furthest forward. Instead of this, at that point there is generally a hollow; this is the cause of so much pain and weakness in the small of the back. The present seats produce discomfort, round shoulders and other distortions.

CHALK, Prepared.—Take a solution of muriate of lime, and add a solution of carbonate of soda as long as it causes precipitation; wash the sediment, and dry it.

CHARCOAL MAKING.—Charcoal made from wood is a form of carbon containing the

ashes, or incombustible portions of the wood from which it is prepared, and some of its volatile ingredients. The principal object of its preparation is its superior heat-making properties as compared with wood. The greater portion of the charcoal offered for sale is burned in kilns, but in thickly wooded regions much is made in the primitive manner which is known as "Charring in pits." The most ancient method of preparing charcoal was to throw the wood in pits dug in the ground, and to keep it partially covered with earth while consuming, and although the wood is now charred on the surface and not in excavations, the process is still called "Pit charring." When it is proposed to make a quantity of wood charcoal, a level place is prepared for the foundation of the pit as it is called, although it is in reality a mound. A chimney is then made by driving stakes of the desired height arranged in a circle about eighteen inches in diameter. The wood for coaling is cut four feet long and hauled to the pit, the large sticks being first split. It is not absolutely necessary that the wood be dry, though the more complete the seasoning the better the results of the charring, since the more water there is present the more heat is abstracted, and more fuel is necessary to expel it. The first sticks are set up against the chimney, the next against these, then others on top of these, and so on, all leaning a little toward the center, until the pile has attained the required size, say twenty-five cords for a thousand-bushel pit.

When the arrangement of the pile is finished, the outer surface is filled in with chips and sticks, and the whole is covered with branches, twigs, leaves, straw or moss, upon which sods or moistened earth are laid together with fine charcoal waste of previous burnings, the depth of the covering varying from six to eight inches, and the whole being smoothed and firmly spat down. Draught holes two or three inches in diameter and four feet apart, are made in the covering at the bottom. A fire is kindled in the bottom of the chimney from the top, and when well a-burning the chimney is filled with wood and covered like the rest of the pit. Constant watch must now be kept that the wood does not burn too rapidly. Evidence of its doing so is given by the appearance of blue smoke, as only a steam-like vapor rises from the vents when the process of charring is going on properly. When this smoke is seen the fire is smothered by packing in green wood at the threatened point, and covering it again closely with straw and earth. If all goes well, a thousand-bushel pit will be burned in ten or fifteen days. As the process proceeds, it is necessary to fill up some of the holes and open others according as the burning progresses from one portion of the pile to the other, or needs accelerating or retarding. Channels are made under the heap for the tarry matters which run out from the wood towards the close of the process.

When the operation is completed the coal is raked out with long-toothed iron rakes. It is best to do this work at night, as then any remaining spark of fire can be detected and promptly extinguished by throwing coal dust or moistened earth on it. After the uncharred brands are removed the coal is ready for market. The coal is hauled away in wagons divided into deep, wide-topped boxes holding 100 bushels or more.

To dump the coal, the horses are hitched to a staple in the hinder part of the wagon bottom, which is made to slide out, the team is started and the coal falls out underneath. Log pits are made by arranging twelve-foot logs in layers. The interstices between the logs are packed with poles and small wood, the pile being boarded up at the ends of the logs, leaving a space of several inches between the boarding and the logs, to be filled with earth, after which the ends and top of the pile are covered with straw and earth, as in the circular pit. The fire is kindled in a trench dug under one end, two feet wide and two feet deep. Vent or draught holes are made under the boarding. These log pits are sometimes ten rods long, and it is not unusual to draw coal from one end, while the other end is yet burning.

Oak and alder make the best charcoal, next to them birch of all kinds, pine, basswood, poplar, and spruce. Hemlock is the least desirable wood for this purpose, as it makes snapping coal.

CHIMNEYS, To Build.—Let the bed be laid of brick and mortar, iron or stone; then the workman should take a brick in his left hand, and with the trowel, draw the mortar upon the end of the brick, from the under side, and not from the outside edge, as is usual. Then, by pressing the brick against the next one, the whole space between the two bricks will be filled with mortar; and so he should point up the inside as perfectly as the outside, as he proceeds.

By drawing the mortar on the edge of the brick, the space between the ends will not always be entirely filled, and will make (where the inside pointing is not attended to) a leaky and unsafe chimney, which, if not kept clear of soot, will, in burning out, stand a good chance of setting the building on fire.

CHIMNEYS, Salt in Building.—In building a chimney, put a quantity of salt into the mortar with which the intercourses of brick are laid. The effect will be that there will never be any accumulation of soot in that chimney. The philosophy is thus stated: The salt in the portion of mortar which is exposed, absorbs moisture every damp day. The soot thus becoming damp falls down into the fireplace.

CHIMNEYS, To Cure when Smoky.—The common causes of smoky chimneys are either that the wind is too much let in above at the mouth of the shaft, or else that the smoke is stifled below. They may also proceed from there being too little room in the vent, particularly where several open into the same funnel. The situation of the house may likewise affect them, especially if backed by higher ground or higher buildings.

The best method of cure is to carry from the air a pipe under the floor and opening under the fire; or, when higher objects are the cause, to fix a movable cowl at the top of the chimney.

In regard to smoky chimneys, a few facts and cautions may be useful; and a very simple remedy may often render the calling in of masons and bricklayers unnecessary.

Observe that a northern aspect often produces a smoky chimney.

A single chimney is apter to smoke than when it forms part of a stack.

Straight funnels seldom draw well.

Large fire-places are apt to smoke, particularly when the aperture of the funnel does not corres-

pond in size. For this a temporary remedy may be found in opening a door or window—a permanent cure by diminishing the lower aperture.

When a smoky chimney is so inconvertible as to require a constant admission of fresh air into the room, the best mode is to introduce a pipe, one of whose apertures shall be in the open air and the other under the grate; or openings may be made near the top of the apartment, if lofty, without any inconvenience even to persons sitting close by the fire.

This species of artificial ventilation will always be found necessary for comfort where gas is used internally, whether a fire is lighted or not.

Where a chimney only smokes when a fire is first lighted, this may be guarded against by allowing the fire to kindle gradually; or more promptly by laying any inflammable substance, such as shavings, on the top of the grate, the rapid combustion of which will warm the air in the chimney, and give it a tendency upwards, before any smoke is produced from the fire itself. If old stove-grates are apt to smoke, they may be improved by setting the stove further back. If that fails, contract the lower orifice.

In cottages, the shortness of the funnel or chimney may produce smoke; in which case the lower orifice must be contracted as small as possible by means of an upright register.

If a kitchen chimney overpowers that of the parlor, as is often the case in small houses, apply to each chimney a free admission of air, until the evil ceases.

When a chimney is filled with smoke, not of its own formation, but from the funnel next to it, an easy remedy offers, in covering each funnel with a conical top, or earthen crock, not cylindrical, but a frustum of a cone, by means of which the two openings are separated a few inches, and the cold air or the gust of wind no longer forces the smoke down with them.

If these remedies fail it will be generally found that the chimney only smokes when the wind is in a particular quarter, connected with the position of some higher building, or a hill, or a grove of trees. In such cases the common turncap, as made by tinmen and ironmongers, will generally be found fully adequate to the end proposed. A case has occurred of curing a smoky chimney exposed to the northwest wind, and commanded by a lofty building on the southeast, by the following contrivance.

A painted tin cap, of a conical form, was suspended by a ring and swivel, so as to swing over the mouth of the chimney-pot by means of an arched strap or bar of iron nailed on each side of the chimney. When a gust of wind laid this cap (which, from its resemblance in form and use to an umbrella, is called a paravent or wind-guard) close to the pot on one side, it opened a wider passage for the escape of the smoke on the opposite side, whichever way the wind came, while rain, hail, etc., were effectually prevented from descending the flue.

CHINAWARE, To Make.—The composition of the eastern or proper chinaware, according to accounts that have great marks of authenticity, is from two earths; one of which is, as was before mentioned, called petunse; the other a refractory earth, called kaolin.

The preparation of the petunse, or aluminous earth, is by pounding the stone till it is reduced to a very fine powder, and then washing it over

to bring it to the most impalpable state, which is thus performed: After the stone is rendered as fine as it can be by pounding or grinding, the powder must be put into a large tub full of water, and, being stirred about, the upper part of the water must be laded out into another tub, by which means the finest particles of the powder will be carried into it. The water in the second tub must be then suffered to stand at rest till the powder be subsided, and as much as can be laded off clear must be put back into the first tub and there being again stirred about, and loaded with a fresh quantity of the most subtle part of the powder, must be laded again into the second tub as before, and this must be repeated till none be left in the first tub but the grosser part of the stone, which, not being of a due fineness, must be again pounded, and treated as at first. The fine powder obtained in the second tub, must be then freed from the water, by lading off the clear part, and suffering what remains to exhale, till the matter becomes of the consistence of soft clay, when it will be fit to be commixed with the kaolin for use.

The kaolin is prepared in the same manner by washing over; but some specimens are so fine, that there is no occasion for this or any other purification.

From these two mixed together, the clay or paste is formed; but it is said that the proportion of the respective quantities is made to vary according to the intended goodness of the ware, the best being made from equal quantities, and the worst from two of the kaolin to one of the petunse.

CHINA (English), Composition of.—The following composition will produce wares, which will possess the properties of the true china, if judiciously managed.

Mix the best white sand, or calcined flints, finely powdered, 20 lbs.; of very white pearlash, 5 lbs.; of white calcined bones, 2 lbs. Temper the whole with the gum Arabic or senegal, dissolved in water.

This requires a considerable force and continuance of heat to bring it to perfection, but it will be very white and good when it is properly treated. Where mica can be obtained, it is preferable to calcined bones, and as it will form a kind of paste for working, a weaker gum-water will answer the purpose.

CHINA (Saxon or Dresden), To Make.—The Saxon composition, of which the chinaware is formed, is greatly similar to that of the eastern. In the place of the petunse, a stone is used, which is improperly called in the German language, bleyspatt, or spar of lead. It is a stone of a very opposite nature, as spars are calcareous, and will, on calcining, become lime; on the other hand, this stone is of a vitreous nature. This spar is of a very hard texture, and of a light flesh-color, or pale whitish red. It is prepared by pounding and washing over, which may be done as above directed, and it is then ready for compounding with the mica. The mica is employed in the Saxon composition for the other ingredients; and is likewise prepared by grinding and washing over, when it is not in a perfect and pure state; but when it is entirely clean, it may be tempered with the texture, thoroughly broken, and it will be of the consistence of soft clay.

The two kinds of earth being prepared in the state of a soft paste, they are to be incorporated

and blended into one mass, which is done by rolling and stirring them well after they are in the same vessel, and then kneading them with the feet till they are thoroughly united. When the compound mass is formed, it is made into cakes, or square pieces, and put by layers into cases of wood or stone, which must be placed in a moist situation, and left for 2 or 3 months; during which time a kind of ferment enters into the mixture, by which the parts of the different matter combine and form a substance with new qualities, unknown while separate. This change shows itself upon the whole mass by a fetid smell, and a greenish or bluish color, and a tenacity like that of clay, or the argillaceous moistened earths. If the time of keeping the paste in this condition be prolonged to a year or more, it will further improve its qualities, but great care must be taken to prevent its becoming dry; to prevent which, there may be occasion to water it. When, however, the described qualities are found in the matter, it is fit for use, and vessels, etc., may be wrought of it without any other preparation.

CHLORINE, To Make.—Heat gently a mixture of muriatic acid and black oxide of manganese. It may be collected like carbonic acid. Care must be taken not to inhale it.

CHROMOS, To Clean.—When you clean them use a soft feather brush, or wipe them with soft chamois skin (a drop of oil may restore clearness), or with a fine linen rag very slightly dampened. Always tenderly.

Next, whenever the original varnish coating is dulled, bruised, or rubbed, revarnish it with thin mastic varnish.

Chromos, like oil paintings, should not be hung in a dark room, but in one with diffused light; and never exposed to the direct rays of the sun.

The chromos after water-colors keep and display better when placed under glass, as they lack the protecting cover of the varnish. The larger chromos, after oil paintings, display, as a general rule, best when framed like original paintings. It is not necessary to put any of these under glass; it is a matter of taste,—preserving them, at the same time, from dust and rough handling.

CISTERN, Filtering.—To obtain the best water at all times, it is not enough that the water be well filtered. To illustrate:—A cistern of 2,000 gallons is filled. After some weeks of continued dry weather, the amount is reduced to, say, 1,000 gallons, at which time the quality of the water will have sensibly improved. A shower occurs, pouring into the cistern, say, 300 gals. The 1,000 gallons is violently mixed with the newly fallen rain, and the result is, the quality of the water is injured for a time, or until sufficient time has elapsed to allow it to settle again.

Again, the process of filtration cannot properly be accomplished in the short time allowed by some devices. Water should be filtered very slowly.

Then, every filtering apparatus should be cleaned out, and all the materials employed thoroughly washed or renewed regularly and somewhat frequently, as required by the character of the roof and the situation of the house, as regards smoke, cinders, dust, etc.

To accomplish the best results, I would construct a cistern of requisite capacity, above the bottom of the cellar, into which all the water

from the roof should be turned. Another cistern of equal capacity, of what is known as the "jug" pattern, should be built below the cellar bottom, having a neck of proper size extending slightly above, and kept closed by a tight cover. Between the two cisterns, construct a box of wood or bricks, say six to ten feet long, and twelve to sixteen inches square, with partitions alternately extending nearly to the top and bottom. Fill this box with the proper filtering materials: broken stone, well washed coarse and fine gravel and sand, charcoal, and, finally, at the outlet, fine sponge.

The stream of water from the receiving cistern should be very small, say one-quarter inch in diameter, which, entering the box at one end, would gently percolate through the mass of filtering materials, and by a small block tin pipe, be conveyed to the bottom of the lower cistern, from which it would be pumped as wanted. The flow would be constant, or until the upper cistern was emptied. This box should also be kept closed by a tight cover, which, when lifted, would allow ready access to remove all the filtering materials, to be washed and returned, or, what is better, to be replaced by clean, fresh materials.

The bottom of the upper cistern should be concave, connecting by a pipe and stop-cock with the drain. Occasionally, when nearly exhausted, it could be easily and thoroughly cleaned and rinsed out, the sediment and dirty water escaping by the drain. The bottom of the lower cistern should also be concave, and at intervals the pipe between the two cisterns should be closed, to allow the lower one to become exhausted in order to cleanse that also.

The upper cistern should be covered by a brick arch, or by matched pine plank, made perfectly tight. Otherwise the evaporation from such a body of water will be injurious to both structure and inmates.

The device of making a filter by a brick partition, or wall in the cistern, drawing the water from the side opposite the ingress pipe, is quite effectual for a time. A little reflection, however, will show that the sediment taken from the water remains; either in the pores of the brick, or in the form of a coating on the surface; and that, after a time, it will vitiate its purpose, and become comparatively inoperative and useless.

The objection to my filtering system is the increased expense; and those parties obliged to depend upon a rain water supply, and who, from necessity or choice, prefer the cheapest article, when first cost alone is considered, will not adopt it; but in many places in the country, where persons want permanently pure water, even if obtained at a greater expense, I think no better arrangement has been devised.

The principal value of a filter depends upon keeping it clean; and to continue to use water, month after month, after the filtering materials have become foul, is not consistent with our ideas of cleanliness, and is positively injurious.

The cistern from which the water is used being at a distance below the cellar bottom, the water is kept sufficiently cool, even in hot weather, to be very palatable.

Some persons, not using a filter, adopt the expedient of having two cisterns on the same level, both connected with the pump, using from

each alternately as the other becomes exhausted. This arrangement is a great improvement upon a single cistern, but will not compare with two, arranged as described above.

The cost of two first class cisterns, of 2,000 gallons capacity each, with filter constructed in the most thorough manner, would, in most localities, be less than the cost of a properly constructed well forty feet in depth.

CLARET, To Distinguish Genuine from Imitation.—It is well known that by far the majority of claret consumed in this country has never seen France, but is made artificially on this side of the Atlantic. It is also no secret that many of these imitations are highly deleterious to health. Every lover of the genuine article will therefore feel indebted to Messrs. Cottini & Fantogini for their simple method of distinguishing the two. They mix fifty cubic centimeters of the suspected claret with 6 cubic centimeters of nitric acid of 42° Baumé, (1.40 spec. gravity,) and heat the mixture to 90-95° Celsius, or nearly the boiling point of water. If the claret is genuine, it will not change its appearance even if treated for an hour, while the imitated article loses its color in about five minutes.

CLOCK, To Make for 25 Cents.—First you get a sheet of stout mill-board, such as is used by bookbinders. This will cost you from six to ten cents. Get size twenty-seven by twenty-two inches. Draw two lines the longest way equally distant from the edge and each other. This divides it into three parts of the same size. Now from the top measure off ten inches for the face, and then with your knife partly cut the board through the rest of the lines below the face, and bend them back and glue together by putting a strip of cloth over the edges where they meet. Mark out the face of your clock, and make a hole for the hands. Go to your tinman, and he will make you a funnel-shaped spout, which you must glue on the bottom. Then make a spool like a cone—running to a point on one end—and eight inches across on the other. Wind a string on this cone, commencing at the large end, and winding down just as you would a top. Tie to the end a conical ink bottle filled with sand. Make some wooden hands, and put them on the face. Then fill your box, now made, with sand, and when it is hung up the sand will run out slowly at the bottom, and as the sand goes out the weights lower, and turn the wheel, which makes the hands go around. It will depend upon the size of the hole at the bottom as to how fast it runs. You can paint it, and make it quite an ornament and curiosity in your house.

CLOTH (Black), To Clean.—Dissolve one ounce of bicarbonate of ammonia in one quart of warm water. With this liquid rub the cloth, using a piece of flannel or black cloth for the purpose. After the application of this solution, clean the cloth well with clear water, dry and iron it, brushing the cloth from time to time in the direction of the fiber.

CLOTH (Enamel), To Make.—The foundation of the article is cotton cloth of the best quality, made expressly for this manufacture. It varies in texture and width according to the kind of goods for which it is intended. The cloth is taken from the bale and wound upon a large iron cylinder, and looks in that position very

much like the huge rolls of home-made cloth. It is now ready to receive its first coat; so it is slowly passed through the machine, across and between the huge iron cylinders, from the smaller of which, at the top, it receives its first coating of composition—a black, disagreeable-looking substance, composed of oil, lamp-black, resin, and other ingredients, boiled together, till about the consistency of melted tar. From between the cylinders, dressed in its black coat, the cloth is carried to and wound upon a huge wooden-frame, resembling in shape the old-fashioned reel. By an arrangement of spokes upon the arms of this huge wheel, each layer of cloth is kept separate, so that no two portions of the cloth will come in contact. The frame, with its contents when filled, is passed into what is called the heater, an apartment kept at a high temperature, for the purpose of drying in the coating or composition. After remaining in the heater a sufficient length of time to complete the drying process, it is removed and passed through the hands of workmen who make all the rough places smooth. It is laid on long tables, and the workmen alternately sprinkle with water and rub with pumice-stone, till the whole surface is made perfectly smooth. The cloth is then wound upon the cylinder again, as at first, and passed through the machine to the huge reels, and again under the pumice-stone. The cloth is passed through the machine five times, or till the required thickness has been laid on. After the last scrubbing down, the fabric is taken to another department, thoroughly varnished, and again passed through the heater. It is now represented as a piece of cotton-cloth, with a thick, shining coat of black, very much resembling patent leather. But it has not yet received its leather finish; so in another apartment it is passed through the enamel-machine, which consists of another set of huge rollers, one of which covers its surface with regular indentations resembling the grain of a leather. The cloth is now carefully measured, and rolled up in packages of suitable size, put up in boxes, and is ready for the market.

COACHMAKERS, Hints to.—A correspondent of the *Coachmakers' Journal* says: In plugging screw holes we glue the edge of the plug; put no glue in the hole. By this means, the surplus glue is left on the surface, and if the plug does not hit the screw it will seldom show. We set the heads of brads well in, then pass a sponge of hot water over them, filling the holes with hot water. This brings the wood more to its natural position, and closes, by degrees, over the head of the brad. When dry, sandpaper off and paint, and the putty will not hit the head of the brad; if it does, it will surely show bad. The brad must have a chance to expand when exposed to the heat of the sun, and not hit the putty; if it does it will force the putty out. We have had no trouble with brad heads or plugs since we adopted this practice.

COAL, Effect of Exposure on.—Coal deteriorates rapidly from exposure to the weather. According to scientific experiments, coal exposed to the weather in heaps during a period of nine months loses fifty per cent. of its value as fuel. It undergoes a process of slow combustion, taking up oxygen and giving off the volatile products of oxidation—air and moisture playing the principal part, and warmth promoting it; the valuable

combustible ingredients are lost, and the injurious ones, as sulphur, oxygen and ash, are relatively increased. Neither wood nor coal can bear long exposure to the elements without losing a large share of its value for fuel.

COAL FIRE, To Make.—The art of making and maintaining a coal fire properly is possessed by but few. We believe that there would be a sensible diminution in the number of domestic quarrels and soured tempers, if a knowledge of it were more general. Husbands would not have to growl and scold over so many late dinners, nor wives fret themselves to skin and bone over obstinate fires that will neither bake, roast nor boil.

There are many faults in the usual construction of a coal fire. A common fault is to use too coarse wood for kindling, and too much of it. This, while it generally succeeds in lighting the coal, leaves a bed of ashes below the coal which interferes with the draft, unless raked out. The wood should be of some rapidly burning variety, which gives a quick and high heat, and should be split fine. It should be so placed that the coal will remain on the top of it, and not fall through to the grate, leaving the kindling on the top of any part of the coal.

A common mistake is to use too large sized coal. A good rule, where stoves or furnaces have a good draft, is to use coal as small as can be used without inconvenience from its sifting too freely through the grate.

Grates should have their bars closely set, for stoves that are cleaned out daily, and have fires lighted in them each morning, while those which are intended to have fire kept in them continuously for days and weeks will not admit of fine grates, on account of the accumulation of ashes and small clinkers.

There is much difference in coal in regard to the formation of clinkers. These are nothing but vitrified or partially vitrified earthy matters, and only can form when a high heat is maintained; they are apt to be troublesome when there is too great draft. A coal-stove or furnace should, therefore, be so constructed that its draft can be perfectly controlled. The bottom draft should admit of being closed air-tight, as nearly as is possible to make it, and there ought always to be provision made for a top draft.

If, however, the draft of a chimney should be so strong that air in too great quantities is drawn in at the bottom when the dampers are closed, a damper in the pipe, which will close it partially, must be employed, though in sluggish chimneys such a damper is apt to force the gases of combustion into the room, and therefore it ought always to be avoided when possible.

The practice of putting ashes on the top of a fire to keep it, is very productive of clinkers, although it answers very well in other respects. Damp coal screenings are better, and may be economically burned in this manner. If a coal fire gets very low, the quickest way to extinguish it is to rake it at the bottom. To preserve a fire under such circumstances, a little coal should be placed on the fire, and when it has caught more may be added, and the raking deferred until it has got well ignited.

When the fire-bricks have become burdened with clinkers which have fused and adhered, they may be cleaned by throwing oyster or clam shells into the fire-box when the fire is very hot.

and allowing the fire to go out. The clinkers will generally cleave off without the use of much force the next morning. From two quarts to half a peck will be sufficient for most stoves, and the operation can be repeated if some of the clinkers still adhere.

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CORAL, Artificial.—Yellow resin, 4 parts; vermilion, 1 part. Melt. This gives a very pretty effect to glass, twigs, cinders, stones, etc., dipped into it. It is also useful for a cement for ladies' fancy work, such as grottoes, etc.

CORAL BASKETS, To Imitate.—Make the basket of pasteboard in any shape you please; dissolve three sticks of sealing-wax in a pint of alcohol; wet the basket with this mixture, and sprinkle on rice which has been about half ground; let it dry, and repeat the process until the pasteboard is covered, after which paint it with the mixture until it is red enough. A brush of hair or feathers should be used.

COTTON, To Detect in Linen Fabric.—A German Professor has discovered the means, by the aid of chemistry, of recognizing the presence of cotton in linen fabrics. He takes a piece of the suspected cloth, about two inches by three-fourths of an inch, and, after having unraveled both weft and warp, plunges it in an alcoholic solution of aniline and fuchsine. The superfluous coloring matter is removed by washing the cloth thus dyed several times in water. If, while it is still wet, it be placed in a saucer containing ammonia, the cotton fibres will immediately become discolored, while those of linen will preserve a fine red color.

COUGH, Lemon for.—Roast the lemon very carefully without burning it; when it is thoroughly hot, cut and squeeze into a cup upon 3 ounces of sugar, finely powdered. Take a spoonful whenever your cough troubles you. It is good and agreeable to the taste. Rarely has it been known to fail of giving relief.

COUNTERFEIT MONEY, Rules for Detecting.—1. Examine the form and features of all human figures on the notes. If the forms are graceful and features distinct, examine the drapery—see if the folds lie natural; and the hair of the head should be observed, and see if the fine strands can be seen.

2.—Examine the lettering, the title of the bank, or the round handwriting on the face of the note. On all genuine bills, the work is done with great skill and perfectness, and there has never been a counterfeit but was defective in the lettering.

3.—The imprint, or engraver's name. By observing the great perfection of the different company names—in the evenness and shape of the fine letters, counterfeiters never get the imprint perfect. This rule alone, if strictly observed, will detect every counterfeit note in existence.

4.—The shading in the back-ground of the vignette, or over or around the letters forming the name of the bank, on a good bill is even and perfect, on a counterfeit is irregular and imperfect.

5.—Examine well the figures on the other parts of the note, containing the denomination, also the letters. Examine well the die work around the figures which stand for the denomination, to see if it is of the same character as that which forms the ornamental work surrounding it.

6.—Never take a bill that is deficient in any of the above points, and if your impression is bad when you first see it, you had better be careful how you become convinced to change your mind—whether your opinion is not altered as you become confused in looking into the texture of the workmanship of the bill.

7.—Examine the name of the State, name of the bank, and name of the town where it is located. If it has been altered from a broken bank, the defects can plainly be seen, as the alteration will show that it has been stamped on.

COURT PLASTER, Substitute for.—Take half a dozen pigs' feet, well cleaned for cooking, and boil to a jelly of say about half a pint or less—then spread with a brush on any waste scraps of silk, and we find it equal to any adhesive plaster we have ever used. Any fatty substance in the boiling of the feet rises to the surface, and when cold can easily be removed. One of its chief excellencies is, that it costs nothing but the trouble of preparing.

CRAYONS.—1. Shell lac, 6 parts; spirit, 4 parts; turpentine, 2 parts; color, 12 parts; pale clay, 12 parts. Mix.—2. Pipe-clay, color as required, water to mix. Form into a stiff paste and roll it into crayons.

CRAYONS, Lithographic.—1. Take white wax, 4 parts; gum lac, 2 parts. Melt over a gentle fire, then add dry tallow soap in shavings, 2 parts. Stir until dissolved. Next add white tallow, 2 parts; copal varnish, 1 part; lampblack, 1 part. Mix well, and continue the heat and stirring until, on trial by cooling a little, it

appears of a proper quality, which should be that it will bear cutting to a fine point, and trace delicate lines without breaking.—2. Take dry white tallow soap, 6 parts; white wax, 6 parts; lampblack, 1 part. Fuse in a covered vessel.

3. Take lampblack, 1 part; tallow soap, 2 parts; shell lac, 2 parts; wax, 4 parts. Mix, with heat, and mold.—4. Take dried tallow soap, 5 parts; wax, 4 parts; lampblack, 1 part. Mix as before.

CRAYON COLORS, To Fix.—Paste your paper on canvas, in a frame, in the usual way, then brush over the back two or three times with the following mixture, and when the last coat is dry give the face of the picture one or two coats in the same way. This will make it resemble an oil painting. Spirits of turpentine, 10 parts; boiled oil, 6 parts. Mix.

CRUCIBLES.—The best crucibles are made from a pure fire-clay, mixed with finely ground cement of old crucibles, and a portion of black lead, or graphite; some pounded coke may be mixed with the plumbago. The clay should be prepared in a similar way as for making pottery ware; the vessels, after being formed, must be slowly dried, and then properly baked in the kiln. Black-lead crucibles are made of 2 parts graphite, and 1 of fire-clay, mixed with water into a paste, pressed in molds, and well dried, but not baked hard in the kiln. This compound forms excellent small or portable furnaces.

DARK PLACE, To Illuminate.—By the use of a mirror to throw a reflection of the sun's rays down a deep, dark well, the bottom is clearly seen, and a lost bucket or other object hooked up. The same means may be applied to light a dark garret, cellar or closet. If there are obstacles preventing success with one glass, take two glasses, one to receive the direct rays of the sun and the other the reflected rays from the mirror.

DEAD ANIMALS, To Preserve in Water Containing Creosote.—In order to preserve dead animals, nothing is necessary but to put them in creosote water prepared by shaking coal-tar creosote with water. According to the size of the animal the immersion should continue one to several weeks. In very large animals it is better to open the skin by a cut, which is not necessary in birds, fishes, or reptiles; they are then dried in the open air, and a position given to them, such as they are wanted to assume. As the bodies remain elastic after drying, they may be packed without much precaution. This process is especially applicable to the above named three classes of animals, as the feathers of birds retain their color, fishes and reptiles their shape and color also. This is a valuable hint to travelers and naturalists, as the creosote water may be prepared when and wherever wanted, and the animals after drying may be packed in boxes like minerals.

DOG SKIN, To Tan with Hair on.—Procure a cask, or barrel, holding from fifteen to eighteen gallons, in which make a liquor of six gallons of water, one and a half pounds of alum, five pounds of salt; in this, soak the skin about ten hours, or until it is in its original condition. Then place the skin on a board and carefully remove all the flesh and grease, finishing by scraping with a dull knife and rubbing with sand paper, or better, pumice stone. Add to the alum and salt liquor six gallons of sour oak or hemlock liquor, which can be procured of any

tanner (or leached from pulverized bark), in which again place the skin. It will tan in about two weeks, becoming as soft and pliable as cloth.

DOOR PLATES (Silver), To Clean.—To clean silver door plates, use a weak solution of ammonia in water, applied with a wet rag. This wash is equally useful for silver plate and jewelry.

DROWNED PERSON, To Raise the Body of.—In a recent failure to recover a body drowned in a river in New-Jersey, a French Canadian undertook the job, and is reported to have proceeded after the following scientific manner. Having supplied himself with some glass gallon jars and a quantity of unslaked lime, he went in a boat to the place where the man was seen to go down. One of the jars was filled half full of lime, then filled up with water and tightly corked. It was then dropped into the water, and soon after exploded at the bottom of the river with a loud report. After the third trial, each time in a different place, the body arose to the surface and was secured.

DWELLINGS, Damp.—It is obvious that, as all external walls are exposed to more or less wet weather, our efforts will be most usefully directed to preventing the moisture from entering at the outer face of the wall; or, if we can not prevent its penetrating the surface, then we must apply ourselves to hindering its passage quite through the wall.

The use of materials which have a very hard face, such as the best sorts of building-stones and bricks, especially machine-made bricks, will, if the joints of the work are well "pointed," that is, filled with mortar, keep out moisture effectually; but when bricks of a porous quality are of necessity used, it is often the best safeguard to "render" the walls with Portland cement. It is important to notice that not only the face but the top of every wall must be protected. It is to keep the wet from soaking into the body of the wall, that every window has a sill of hard stone or some other impervious material, and that all parapets or other unprotected walls require a coping.

With materials that are not naturally impervious, many attempts have been made to arrive at some mode of rendering them so. Perhaps oil, when applied thoroughly and in dry weather, may be said to be as yet the only application which extensive experience has pronounced successful, though a wash of soap and alum has been frequently found useful.

If the surface is once passed, the thicker the wall, the longer it is in being thoroughly soaked, and the less wet will penetrate it from short rains; but almost the thickest solid wall will sooner or later give passage to continuous moisture if its outer face be once penetrated; and experience has constantly shown that a hollow wall is drier than a solid wall of the same thickness. When building in stone, it is especially desirable to have an inner lining of brick, with a clear space of from two to four inches between it and the wall, and as few solid points of contact between the two as possible.

In some cases, contact between the outer and inner wall can be almost entirely prevented by connecting them together with iron cramps. When this is not done, the greatest care must be taken to reduce the points of connection to a minimum, to employ hard materials at those

points, and even to break the continuity of the communication by leaving those bricks which are used as ties clear at both ends. It is almost needless to add that the cavity must be kept clear of mortar and rubbish. A less perfect mode of preventing annoyance from damp than by building hollow walls, but a favorite expedient, is to "batten" the inner face of the wall; that is to say, to place strips of wood against it, cover them with laths, and plaster on the lathing. By this means, the inner face next the room is usually preserved from the actual appearance of moisture; but as it is possible that the whole wall behind the battening, if solid, may be moist all the time, this is an inferior method to the hollow wall. For very exposed situations, or very porous materials, a combination of the two, that is, a hollow wall, battened in addition, is to be recommended.

Where moisture is at all likely to enter from the ground on which a house stands, it is most desirable to cut off the foot of the wall from all communication with the upper part by a "damp course," composed either of slate laid in cement, or of some sort of asphalt or coal-tar, or of vitrified tiles made for the purpose; and this should go quite through the external walls, (in damp soils it should be used also in internal walls,) below the level of the lowest floor. Where earth comes against the walls to any extent, it is desirable to have either an open area, or what is called a "dry area," to prevent its actually touching the walls; and in wet soils an intercepting drain outside that area will also be of service.

In good buildings, it is often customary to cover the whole surface of the earth under all floors with a layer of concrete or asphalt, or some other hard body; and this, no doubt, promotes the dryness of the building to a great extent. Solid floors, that is, floors of stone, tile, or brick, should always be laid on a pretty thick layer of concrete or dry rubbish, not direct on the earth.

Forming a dry area around the walls is frequently a serviceable remedy where the lower part of a house is damp, and draining the site is often of very great service. So, in many cases, is the taking up the lowest floor, removing a foot or two of earth, covering the fresh surface with concrete, and relaying the floor, leaving good ventilating channels for the air space so formed.

A very fertile source of dampness is "drip." Even the small amount of rain-water falling on a window, and which, after draining down, finally drips from the window-sill, has a great tendency to render the wall immediately below that sill damp; for whenever the wind blows toward the wall, every drop is likely to be blown against its surface. This, by the by, shows the folly of our making the wall immediately under window-sills thinner than elsewhere, which it is customary to do for convenience' sake.

The drip from a roof not furnished with a gutter, or from a veranda that is too shallow, or, worst of all, from a defective rain-water pipe, is, however, larger in quantity, and more exposed to wind than that from a simple window-sill; and this source of dampness often remains for a long time undetected, as the place where the water falls against the wall will often be distant from that where it escapes.

As a general rule, it may be laid down that there is no auxiliary so powerful in diminishing

the amount of such moisture as can not be actually shut out from any part of a building, as a free circulation of air. Let, therefore, openings communicating with the cavities and vacant spaces of a house be freely provided. The hollow space in a roof, the space between floor and ceiling, and the hollow under a floor, should all enjoy a free circulation of air. It is even desirable, in building hollow walls, to attempt to promote a circulation of air in the cavity, and in all these cases it should be remembered that two openings are requisite to each hollow, in order to give much hope of a current or change of air. Where there is no ventilation under the lowest floor of a house, the joists and timbers will soon begin to decay. This may be accelerated by covering the floor with oil-cloth, or kamptulicon, or similar non-porous coverings. Ivy or creepers against external walls, and even trees growing close to them, tend to promote moisture by cutting off the circulation of air.

The failure of any portion of the arrangements for water supply or drainage will be pretty sure to lead to damp. As general rules, no drain should ever be permitted to pass under any part of a dwelling house; and when this can not be prevented, the drain should be so laid, without being covered up with earth, that every part of it which is under the floor of the house can be reached at once. The water pipes, on the other hand, should be kept well within the house for warmth's sake, and where they leave it, should be at a level of not less than three feet, at the least, below the surface, for protection against frost. When practicable, water pipes should be left where they can be seen and got at. Iron is preferable to lead for their material, and the arrangements should always include the means of shutting off water supplies in very frosty weather.

It is wise to try to select a wet day for looking over a house, for if the day be fine, and the weather dry, damp spots as well as many other defects may be easily overlooked. Let the intending tenant look for the existence of damp courses, dry areas, and ventilation under floors; let him avoid a ground floor that is not a little raised above the earth outside, unless he is sure there is a good cavity under it well ventilated.

In one word, in choosing a house in which a man intends himself and his family to live, and particularly on first moving into a new built residence, he should look out for the indications of damp as pointing out the presence of one of the most serious enemies to the comfort, if not to the continuance, of their life, which he can have to encounter.

EARTH CLOSET, *The*.—The earth closet is the invention of the Rev. Henry Moule, of Fordington Vicarage, Dorsetshire, England.

It is based on the power of clay and the decomposed organic matter found in the soil to absorb and retain all offensive odors and all fertilizing matters; and it consists, essentially, of a mechanical contrivance (attached to the ordinary seat) for measuring out and discharging into the vault or pan below a sufficient quantity of sifted dry earth to entirely cover the solid ordure and to absorb the urine.

The discharge of earth is effected by an ordinary pull-up similar to that used in the water closet, or (in the self-acting apparatus) by the rising of the seat when the weight of the person is removed.

The vault or pan under the seat is so arranged that the accumulation may be removed at pleasure.

From the moment when the earth is discharged and the evacuation is covered, all offensive exhalation entirely ceases. Under certain circumstances there may be at times a slight odor of guano mixed with earth; but this is so trifling and so local that a commode arranged on this plan may, without the least annoyance, be kept in use in any room.

In the making of an earth closet all that is necessary is to have a supply of coarsely sifted sun-dried earth with which to cover the bottom of the vessel to be used, and after use to cover the deposit. A small box of earth and a tin scoop are sufficient to prevent the gravest annoyance of the sick-room. But, of course, for constant use it is desirable to have a more convenient apparatus,—something which requires less care, and is less troublesome in many ways.

To this end the patented invention of Mr. Moule is applicable. This comprises a tight receptacle under the seat, a reservoir for storing dry earth, and an apparatus to measure out the requisite quantity and throw it upon the deposit.

Earth alone is proved to be the best deodorizer, and far superior to any disinfectants; but where it is difficult to obtain earth abundantly, sifted ashes may be mixed with it in proportion of two of earth to one of ashes.

As the first requirement is dry earth sifted, and as this is usually thought to be a great difficulty in the way of the adoption of the dry earth system, the following remarks will at once remove such an impression:—

The earth commode and closet, if used by six persons daily, will require on an average about one hundred-weight of earth per week. This may be dried for family use in a drawer made to fit under the kitchen range, and which may be filled with earth one morning and left until the next. The drawer should reach to within two inches of the bottom bar of the grate. A frame with a handle, covered with fine wire netting, forming a kind of shovel, should be placed on this drawer; the finer ashes will fall through, mixing with the earth, whilst the cinders will remain on the top, to be from time to time thrown on the fire.

The earth used in the earth closet must be dry—as dry as it is possible to keep it by protection from rain, dew, and mist. However dry it may be made by artificial means, it will absorb the hygrometric moisture of the atmosphere, which could be excluded only by hermetical sealing. This amount of moisture, which is not perceptible to the sight or touch, in no way interferes with its efficiency. But it must be air-dry, or it will not fully accomplish its purpose.

The best and cheapest drying apparatus is the sun and wind of a summer day. During a drought the parched surface of naked land is in precisely the condition needed for use, and a year's supply may then be taken into a close out-building or a dry cellar, and stored until wanted.

Those who have not made, or cannot make, this provision, may store damp earth in a well-ventilated place, from which mists can be excluded, and in a longer or shorter time, according to the climate, it will become dry—just as bread

so kept would do. The writer has had a commode in constant use for nine months, and nearly all of his winter's supply of earth has been dried and re-dried in a hoghead lying on its side, its open end—facing the south—being protected from rain and mist by a close screen of rough boards leaning against it. The sun had very little chance at it, but the wind had, and the drying has been sufficiently rapid for such a limited supply as is needed for one commode.

At the experimental station of the United States Engineers (at Fort Adams) there is in use a sort of hot-bed, raised a little from the ground with a board floor, and provided with movable sashes hatted at the joints. The earth is thrown loosely in to a depth of about six inches, and whenever a drying wind blows, the sashes are raised at both ends. In damp weather they are kept close, and when the sun shines, without there being much wind, they are raised at the back only enough to allow the escape of the moisture evaporated. This plan is cheap, simple, and perfectly effective.

To dry the earth in a more systematic way, especially for the supply of towns or large factories, it will be necessary, particularly in winter, to employ the aid of fire heat. The scale on which this is to be done must determine the extent of the appliances for the purpose. Earth enough for the use of a family may be dried in a shallow box near the furnace, or the kitchen stove or range. For the supply of larger establishments or for towns, when the requisite quantity of earth has not been stored in the summer, it will be well to use a drying apparatus similar to one erected for the supply of a number of closets in New Haven.

This is a plate $\frac{1}{2}$ inch boiler iron—condemned for other use—set on brick walls high enough to allow a small stove to be placed under it, the pipe or flue running from the stove, which is in the front of the space, to an opening at the rear. The earth is spread upon the plate a few inches deep, and is very rapidly made ready for use.

In the country, where earth is plenty, and where there is use on the farm or in the garden for the manure, it will be best to compost the accumulation of the closet until required for use, and to supply the closet with fresh earth; not because it is more effective than that which has been several times used, but because it is better to have the manure as bulky as possible for ease of even distribution. But in towns, and in all cases in which the manure has to be transported to a distance, making it desirable that it be as concentrated as possible, the same earth should be used over and over again. It has been demonstrated that the same earth may be used six or seven times over, until it becomes equal to Peruvian guano in richness, without losing its efficiency as a deodorizer.

Earth owes its deodorizing power to both its clay and its decomposed organic matter, and—as in the case of the soil of an old garden which has been heavily manured for many years—the manure itself, when thoroughly decomposed, only adds to the disinfecting strength of the earth, by adding to its humus. In fact, instances are cited in which the same earth has passed ten times through the closet, receiving at each use an addition to its manurial value. Of course in time the limit will be passed, and the preponderance of organic matter will tell on the effect,

so that it is found in most cases that more than six or seven uses are enough to reduce the deodorizing effect.

When the earth is removed from the closet or the commode, it should be emptied into a barrel, a cask, or a bin, in a sheltered but well ventilated place. Here it will soon so far decompose that all traces of paper and of solid feces will disappear, and it will be to a considerable extent dried. It should now be worked over with a shovel or a rake until its parts are perfectly mixed, and it may then be dried by natural or artificial means, as circumstances suggest, and prepared for another use. Until the decomposition of the foreign matters has become complete, it is better that the mass be kept in a compact body; after that, the more it can be spread the more rapidly will it dry, though it will in time become dry in the barrel or bin.

In the case of fixed closets holding a three months' supply, it is hardly necessary to resort to any artificial means of drying, nor even to any manipulation. The accumulation in the vault or box must be leveled off with a rake from time to time, and this will sufficiently mix the earth and feces.

In such cases it would be the best arrangement to have two bins, equal in size to the capacity of the reservoir and of the vault of the closet; these may be in a shed connected with a privy. One of the bins and the reservoir above the hopper being filled with sifted dry earth, and the other bin with freshly collected earth, we go on and use out the supply in the reservoir. In three months it has all passed into the vault and is mixed with feces. We now fill the reservoir with contents of the first bin, and put the contents of the vault in its place. When the reservoir is again empty, the earth that was freshly collected and moist six months before is dry and fit to be sifted into the reservoir, the bin from which it is taken being filled from the vault. When the reservoir has been again emptied, the first clearing of the vault will have had six months to become dry, and may be sifted and used. If the same earth is used six times over, the original supply will last four years and a half, at the end of which time it will be worth fully fifty dollars per ton as manure.

The quantity of earth that it is necessary to supply will depend on the frequency with which the closet is used, and on the quantity of earth that it is made to contain. The writer has, without other facilities for drying than those described above, found four barrels to be sufficient for a commode constantly used by three persons.

Under the arrangement discussed above, with a reservoir and two bins, each holding a three months' supply for a family of ten persons, each receptacle would require a capacity equal to that of a cube of three and a half feet, which would give an abundant supply for all emergencies. These receptacles, once being filled, no more earth would be needed for from four to five years. All that would be required would be that four times a year the earth be sifted, and that occasionally the contents of the vault be leveled off.

By Professor S. W. Johnson's estimate of the value of night-soil as manure, this earth, after it had passed six times through the closet, would be worth from \$200 to \$250. Other estimates would give it a much higher value.

The earth for the closet must not only be dry; it must be sifted. Up to a certain point, the finer it is the more effective it is. That is, while it will answer the purpose if it is passed through a common coal sifter, it will much better envelop the deposit, will distribute itself more widely, and will make more dust in every part of the vault (a desirable thing, on account of the exhalations from the uncovered fresh feces), if it has been passed through a sieve having six meshes to the inch. The finer the sieve the more will small pebbles be excluded. These are objectionable, not only on account of the space they occupy, but they dilute the earth proper and do no good.

The best earth is that used for making bricks or earthenware—that is, a strong clay; but any soil or subsoil that contains enough clay or vegetable matter to make it arable will answer a satisfactory purpose. A very sterile gravel and a nearly pure sandy soil should be rejected. The "mould" of an old garden or field is excellent, and the "yellow dirt" below it is still better. Either of these treated as above described will be found to entirely absorb and destroy the odor of the most offensive feces from the moment when it envelops it until, years afterwards, if necessary, it is removed to the field; so that the earth-closet may be in the house or out of the house, as is most convenient, without considering the question of foul odors or of ventilation.

Wood ashes must under no circumstances be used, as the potash that they contain has the effect of driving off the volatile parts of the deposit. Anthracite coal ashes can be used with perfect success in winter, and probably in summer as well, but we cannot say this positively. We can see no reason why the ashes of bituminous coal may not be equally effective, but Mr. Moule recommends that they be mixed with one-half their bulk of earth.

All ashes are objectionable for use in commodes in the house, from the dust that flies when they are put into the hopper; but in the case of fixed closets this difficulty would not be noticed. On shipboard, especially on steam-ships, where water-closets are always a nuisance, the use of ashes would be entirely successful.

The earth-closet, like all other human contrivances, needs attention. The earth in the vault will not deodorize the fouling of the seat; wet earth will not deodorize the feces that it covers; and if the accumulation is not occasionally leveled, the earth will not be so thrown as to entirely cover recent deposits. These things must be looked to, but they require no more attention than does the care of the water-closet; and, if the needed attention is given, the depressing odor that so often accompanies even the best-arranged water-closets will be entirely unknown, while the full convenience of having accommodations in the house, and even in the sick-room, may be better and much more cheaply attained by the aid of the earth-closet than by that of the water-closet.

EBONY, To Imitate.—Ebony can be imitated by using a dye of logwood, galls, and sulphate or acetate of iron; but it will always look dull and unnatural unless rightly polished, when it will come out a most brilliant, shiny black. It is done in this way: Put the dyed or finished article in the lathe, turn a great speed, and while in revolution, firmly and evenly press

the siliceous rind of bamboo or a hard wood burnisher against the article, and continue the operation till all the grain is reduced into a smooth glossy surface. The bamboo is best, it is so unyielding and hard in texture. Smooth flat work, not adapted to a lathe, must be rubbed till a polish is obtained.

EGGS, To Color.—Eggs are colored variously, thus: A dark rosewood color by pouring half a gallon of boiling water upon from one quarter to one eighth of a pound of logwood chips. This makes the dye; put the eggs therein and let them boil for one hour. You will have a hard boiled egg, but the color will be beautiful. To vary the color or to write a name on the egg, drop melted beeswax on the shell of the egg in the pattern you want it; then put the egg into the dye and leave it as above. When you take it out scrape off the wax and beneath it the shell will be all white, the rest of it will be dyed. For a faint yellow color onion skins will do, used like the logwood. To increase the color wrap some of the onion skins around the egg and leave it in the dye. The skins must be fastened of course. By onion skins we mean the dry, yellow outside skin of the onion. A good effect is also got by taking a piece of nicely figured calico, putting it neatly around the egg and then allowing it to remain either in the onion skin or logwood dye pot. The figure in the calico generally comes out and fixes itself in the egg shell. Variations of color may be had by using any of the vegetable dyes.

EGGS (White of), To Preserve.—There are several ways of preserving albumen; one is by drying it at a low temperature (otherwise it coagulates) and then powdering it, when it is always ready for solution. The second is a preservative like carbolic acid, (phenylic alcohol,) when there are no objections to its odor. Otherwise, 5 per cent. of sulphite of soda (not sulphate) will accomplish the same purpose, and give an odorless and almost tasteless preparation.

EGGS OF PHARAOH'S SERPENTS, To Make.—Take mercury and dissolve it in moderately dilute nitric acid by means of heat, taking care, however, that there be always an excess of metallic mercury remaining; decant the solution and pour it into a solution of sulpho-cyanide of ammonium or potassium, which may be bought at a good drug store, or of a dealer in chemicals. Equal weights of both will answer. A precipitate will fall to the bottom of the beaker or jar, which is to be collected on a filter and washed two or three times with water, when it is put in a warm place to dry. Take for every pound of this material one ounce of gum tragacanth which has been soaked in hot water. When the gum is completely softened it is to be transferred to a mortar, and the pulverized and dried precipitate gradually mixed with it by means of a little water, so as to present a somewhat dry pill mass, from which by hand pellets of the desired size are formed, put on a piece of glass, and dried again; they are then ready for use.

EMBALMING, French Method.—The following is M. Gannal's mixture for injecting the carotid artery, whereby all the purposes of embalming are attained:—Take dry sulphate of alumine, 1 kilogramme, (equal 2 lbs. 3 oz. 5 drs. avoirdupois,) dissolved in half a litre (a little less than a pint) of warm water, and marking 32° of the aerometer. Three or four litres of this mix-

ture will be sufficient to inject all the vessels of the human body, and will preserve it in the summer; in the winter, from one to two litres will be enough. But to keep away insects, there should be added to the above chlorure of copper, at the rate of 100 grammes to a kilogramme of the sulphate of alumine; or else 50 grammes of arsenious acid. This applies to all kinds of animals, birds, fishes, etc., as well as to the human subject. The above process has been introduced into the great anatomical schools in Paris; and in nearly all the recent interments of distinguished individuals, the old and revolting mode of embalming has been superseded by this new and simple method.

ENAMELS.—Transparent or opaque substances, usually formed of glass colored with metallic oxides, and applied in a thin stratum to brightly polished metallic surfaces, (copper or gold,) on which they are fused by the flame of a lamp urged by the blow-pipe, or by the heat of a small furnace, and in cooling form a sort of vitreous varnish. The art of enameling acquired the greatest perfection in ancient times, and very beautiful specimens are still preserved, which the moderns are unable to equal, and with the materials of which they are totally unacquainted. At the present day, this pleasing and useful application of human industry is carried on with the greatest success by the Venetians, and, after them, by the French. The limits of this work will not permit a description of the various operations of enameling, which essentially depend on skillful manipulation; a knowledge of which can only be obtained by long practice. The preparation of enamels being, however, entirely dependent on chemistry, I deem it proper to present the following formulæ to the reader. It is nevertheless right to remark, that almost every artist has his own receipts.

The basis of all enamels is a highly transparent and fusible glass, which readily receives a color on the addition of metallic oxides. As this is required in the preparation of many of those that follow, it is placed first.

ENAMELS, Base or Flux for.—1. Red lead 16 parts; calcined borax 3 parts; powdered flint glass 12 parts; powdered flints 4 parts; fuse in a Hessian crucible for 12 hours, then pour it out into water, and reduce it to a powder in a biscuit-ware mortar.

2. Powdered flints 10 parts; nitre and white arsenic, of each 1 part; as last.

3. Flint glass 3 oz.; red lead 1 oz.; as last.

4. Red lead 18 parts; borax (not calcined) 11 parts; flint glass 16 parts; as last.

5. Flint glass 6 parts; flux No. 2 (above) 4 parts; red lead 8 parts; as last.

6. Tin 2 to 5 parts; lead 10 parts; calcine in an iron pot at a dull cherry-red heat, and scrape off the oxide as it forms, observing to obtain it quite free from undecomposed metal; when enough of the dross is obtained, reduce it to fine powder by grinding and elutriation, then mix 4 parts of this powder with an equal weight of pure sand or powdered flints, and 1 of sea salt, or other alkaline matter, fuse the mixture in a Hessian crucible, and proceed as before. The best proportions of the tin and lead, for all ordinary purposes, are about 3 of the former to 10 of the latter. The calcined mixed oxides are commonly called "calcine."

7. Lead and tin, equal parts; calcine as above;

and take of the mixed oxides, or calcine a ground flints, of each 1 part; pure subcarbonate of potash 2 parts; as before.

8. Lead 30 parts; tin 33 parts; calcine as before, then mix 50 parts of the calcine with an equal weight of flints, in powder, and 1 lb. of salts of tartar; as before. A fine dead white enamel.

Remarks. The precise qualities of the reducts of the above processes depend greatly on the duration and degree of heat employed. Increasing the quantity of sand, glass, or flux, the enamel is rendered more fusible, and opacity and whiteness is increased by the action of oxide of tin. The use of borax should be avoided, or used very sparingly, as it is to make the enamel effloresce and lose color.

ENAMELS, Black.—1. Pure clay 3 parts; protoxide of iron 1 part; mix and fuse. Black.

2. Calcined iron (protoxide) 12 parts; of cobalt 1 part; mix and add an equal weight of white flux.

3. Peroxide of manganese 3 parts; zinc 1 part; mix and add it as required to white.

ENAMELS, Blue.—1. Either of the flux colored with oxide of cobalt.

2. Sand, red lead, and nitre, of each 10 parts; flint glass or ground flints 20 parts; oxide of cobalt 1 part, more or less, the quantity whole depending on the depth of color required.

ENAMELS, Brown.—1. Red lead 16 parts; calcined iron, of each 1 part; antimony, litharge, and sand, of each 2 parts; mix and add it in the required proportion to a flux, according to the color desired. A little oxide of cobalt or saffre frequently added, and alters the shade of brown.

2. Manganese 5 parts; red lead 16 parts; flint powder 8 parts; mix.

3. Manganese 9 parts; red lead 34 parts; flint powder 16 parts.

ENAMELS, Green.—1. Flux 2 lbs.; black oxide of copper 1 oz.; red oxide of iron $\frac{1}{2}$ dr. mix.

2. As above, but use the red oxide of copper. Less decisive.

3. Copper dust and litharge, of each 2 oz.; nitre 1 oz.; sand 4 oz.; flux as much as required.

4. Add oxide of chrome to a sufficient quantity of flux to produce the desired shade; when well managed, the color is superb, and will stand a very great heat; but in common hands, it frequently turns on the dead-leaf tinge.

5. Transparent flux 5 oz.; black oxide of copper 2 scruples; oxide of chrome 2 grs. Resembles the emerald.

6. Mix blue and yellow enamel in the required proportions.

ENAMELS, Olive.—Good blue enamel 2 parts; black and yellow do., of each 1 part; mix. (See also BROWN ENAMELS.)

ENAMELS, Orange.—1. Red lead 12 parts; red sulphate of iron and oxide of antimony, of each 1 part; flint powder 3 parts; calcine, powder, and melt with flux, 50 parts.

2. Red lead 12 parts; oxide of antimony 4 parts; flint powder 3 parts; red sulphate of iron 1 part; calcine, then add flux 5 parts to every 8 parts of this mixture.

ENAMELS, Purple.—1. Flux colored with oxide of gold, purple precipitate of cassius, or peroxide of manganese.

hur, nitre, vitriol, antimony, and oxide each 1 lb.; red lead 60 lbs.; mix and add powder; add rose copper 19 oz.; crocus martis $1\frac{1}{2}$ oz.; borax 3 oz.; of a compound formed of gold, silver, and fuse, stirring the melted mass over rod all the time, then place it in and submit them to the action of a dry furnace for 24 hours.

said to be the purple enamel used in pictures of St. Peter's at Rome.

ELS, Red.—1. Sulphate of iron (dark) 1 part; a mixture of 6 parts of red of colcothar, 3 parts; dark red.

sulphate of iron 2 parts; flux (No. 1) white lead 3 parts; light red.

or flux colored with the red or pro-copper. Should the color pass into or brown, from the partial peroxidization of copper, from the heat being raised the red color may be restored by the use of any carbonaceous matter, as tallow, &c.

most beautiful and costly red, inclining purple tinge, is produced by tinging wax with the oxide or salts of gold, or purple precipitate of cassius, which is gold and tin. In the hands of the artist, any of these substances produce red of the most exquisite hue: when heated, the enamel comes from the fire less, and afterwards receives its rich the flame of a candle or lamp, urged with a pipe.

ELS, Rose-Colored.—Purple enamel, 3 parts; flux 90 parts; mix and add, or oxide of silver, 1 part or less.

ELS, Transparent.—Either of the above the last three.

ELS, Violet.—Saline or alkaline frits colored with small quantities of permanganate. As the color depends on the degree at the maximum of oxidation, concolor substances that would abstract any oxygen should be avoided. The same applies to other metallic oxides.

ELS, White.—1. Calcine (from two and 1 part of lead calcined together) crystal or frit 2 parts; a very trifling quantity of manganese; powder, mix, melt, and add mass into clean water; dry, powder in a fuse, and repeat the whole process, observing to avoid contamination with dirt, or oxide of iron. A fine dead

red diaphoretic antimony 1 part; fine oxide of lead (free from lead) 3 parts; mix, and add before. Very fine.

For enamel, the articles must be prepared from foreign admixture, as this would be injurious. When well managed, either of the above forms will produce a paste that will adhere.

ELS, Yellow.—Red lead 8 oz.; oxide of iron and tin, calcined together, of each 1 lb.; add flux (No. 4) 15 oz.; mix. By varying the proportion of the ingredients various shades may be produced.

tin ashes, litharge, antimony, and oxide of iron 1 oz.; nitre 4 oz.; mix, fuse, and add the product to any quantity of oxide to the color required.

oxide of antimony, alum, and sal

ammoniac, of each 1 part; pure carbonate of lead 1 to 3 parts, as required; all in powder; mix, and expose to a heat sufficiently high to decompose the sal ammoniac. Very bright.

4. Flux fused with oxide of lead, and a little red oxide of iron.

5. Pure oxide of silver added to the metallic fluxes. The salts of silver are also used, but are difficult to manage. If a thin film of oxide of silver be spread over the surface of the enamel to be colored, exposed to a moderate heat, then withdrawn, and the film of reduced silver on the surface removed, the part under will be found tinged of a fine yellow.

Superior yellow enamels are less easily produced than most other colors; they require but little flux, and that mostly of a metallic nature.

ENAMELING WOOD WORK.—We have very considerable doubts as to whether polished paint may be considered in good taste when used for the interiors of drawing rooms, or, in fact, of any room. There is a want of repose, and a garishness about gloss colors, which are scarcely compatible with that quietness and repose so necessary to the perfect satisfaction of the educated eye. Polished glass is beautiful, and never out of place; the same may be said of marble, of gems, and of all steel work or instruments. With all these, polish is the one thing needful to develop their beauty and finish, and, in fact, is a necessity of the material. This is so self-evident that we never for a moment doubt its propriety or imagine it would be better otherwise. Fitness, beauty, and utility are a consequence of the polish in all these cases, and therefore proper and right from every point of view; but the same reasoning will not apply to polished paint, that is to say, plain tints of colors. Of course, imitations of woods and marbles may be polished with propriety and without offense to good taste, simply because we expect to see them so, and they would not be finished if left unvarnished and unpolished. But it is otherwise with plain colors, which, when glossy, have too much the look of the japanner's shop or the tea tray business. These remarks apply principally to that so-called enamel work which is produced by merely painting the work and finishing it with varnish, when, as a matter of course, it very soon becomes discolored; and even when first done it is a mistake in name and execution, and a gross offense against good taste. The best enamel work—of which there is but little done in consequence of its great cost—is free, in some measure, from the objections urged against the common work. Its manipulation requires so much patience and care that it is a very difficult matter to find men who have the qualifications requisite for preparing such fine work, and therefore it is very rare to see a really good job. In getting up enamel work, much care is requisite in the selection and use of the material required. The filling-up color, which forms the body of the enamel, is of the greatest importance to the ultimate success of the work. Of this material there are several kinds manufactured—black, brown, and yellow, for coach painters, japanners, and others; but for use in interior decoration we prefer to use the white lead filling, as we can, by adding the necessary staining colors (which do not affect the properties of the enamel), form a solid body of color of the same tint, or nearly so, as that with which the work is required to be

finished, and thus do away with the objections, which may be urged against the black or dark-colored filling. For it will be evident to the plainest comprehension that if work which has to be finished white, or with very light tints of color, be filled up with dark-colored filling, that the number of coats of paint which will be required to obscure or kill the dark color will be so many that there will be danger of the work becoming rough and uneven in parts—at all events there can be no question that work which is left with a smooth, even surface, produced by rubbing alone, must be much finer in texture than any that can possibly be left by the brush. The white lead should be ground stiff in turpentine, and about one fourth part of the ordinary white lead, ground in oil, added to it, in order to prevent the enamel cracking, which it has a tendency to do, except there be some little oil mixed with it. A sufficient quantity of polishing copal or best carriage varnish should now be added to bind it so that it will rub down easily, which fact cannot be properly ascertained except by actual trial, inasmuch as the drying properties of varnishes vary, and other causes influence the matter. If there be too much varnish in the stuff the work will be exceedingly difficult to cut down, and if too little, it is apt to break up in rubbing, so that it is always the safest plan to try the enamel color before commencing anything important. The color, being properly mixed, should be laid on the work in the ordinary manner, using it rather freely. It may be as well to state here that no filling should be put upon new work without the same having had two or three coats of ordinary oil paint, nor on old work without its having one coat. This gives a key for the filling to bind to. Successive coats of the filling should now be laid on the work until there is a sufficient thickness to cut down to a level surface, filling up the whole of the indentations and undulations of the panel. One day should intervene between each coat, in order to allow it to harden in some degree. When a sufficient number of coats is put on (which number will, of course, depend upon the state of the work to be filled up), it should stand for a fortnight or three weeks, until it is thoroughly hard; it will then be ready for cutting down, which is to be done with felt, ground pumice-stone, and water. The felt used should be such as the marble masons use for polishing marble, which varies in thickness from one eighth to half an inch, and about three inches square. This should be fastened by the aid of patent knotting or other resinous gum, to square pieces of wood of the same size, but one inch thick, so as to give a good hold for the hand in using. These pieces of wood, covered with felt, may be made of any size or shape, to fit molded surfaces or other inequalities. The pumice-stone to be used should be of different degrees of fineness, and should be carefully selected, so as to be sure that it is free from any foreign substance. It is sold ready ground, but in situations where it cannot be conveniently got, it may be prepared from the lump, by grinding or crushing with a stone and muller, and then passed through fine sieves or muslin; by using these of different degrees of texture the ground pumice may be produced of different degrees of fineness. Except great care be exercised in this matter, it will be found that particles of grit will be mixed

with it, which in using, get on to the work, and make deep scratches, thus causing endless trouble and annoyance, besides spoiling the work. The greatest care is also required in keeping the felt clean and free from grit. Many workmen are careless in this matter, and when working set down the felt on the step-ladder or floor, and thus particles of sand or grit get upon it, and so mischief is done.

In cutting down, it is best to use a piece of soft lump pumice-stone to take off the rough parts. The felt and ground pumice should now be used with water, the work should be wet with a sponge, and the felt soaked in water, and then into the powdered pumice, and the work rubbed with it, keeping it moderately wet, and rubbing with a circular motion, and not straight up and down and across, with a light touch, using only just as much pressure as will cause the pumice to bite, which will be very clearly felt while the hand is in motion. Much care and patience is required to do this properly, for if the pressure be too great it forces the pumice into the body of the filling color, and scratches it instead of cutting or grinding it fairly down. No hurry will avail in doing this work; it must have its time; hurry only defeats the end in view, and often causes much unnecessary labor. A scratch, caused by want of care and too much haste, will often throw the work back for days, and involve the cost and labor of re-filling. We find in practice that the purpose is best answered by using the pumice-stone, the coarser kind first, then the medium, and finishing with the finest last. It will be found advantageous to let a day elapse between the rubbing, for when the surface is cut down the filling will in all cases be softer underneath, and if it be allowed to stand for a day, the newly exposed surface gets harder, and of course rubs down better in consequence. The pumice-stone should be well washed off the work occasionally, in order that we may see what progress is being made, and if it require more rubbing or not. If, while in progress, it be found not to be sufficiently filled up, it may have one or more coats of filling after it has been roughly cut down, and before much labor has been spent upon it.

When sufficiently rubbed down with the pumice-stone—that is to say, when it has been cut down to a fine, level, and uniform surface, the work should stand for a day or two to harden. It will now depend entirely upon the work, as to whether it must be polished upon the filling, or whether it will have to be varnished and polished. If the filling be of the right color, and has rubbed down of one uniform tint, we prefer it to be finished in this state, because, in the first place, it will have a surface and texture which cannot be got by any other means. Finished in this state, there is an absence of that glare-polish—if we may use the term—which is inseparable from varnish polish. After it has stood a day or two, the work, if it be intended to be left in the state we have been speaking about, must be polished in this wise: Take a clean felt and rotten stone, either in oil or water, and with this rub the work as before, until the polish begins to appear; then take a boss (*i. e.* a ball of cotton wool inclosed in fine silk), put the rotten stone upon this and keep rubbing with the circular motion until the polish is uniform and equal all over. The rotten stone must now be carefully

cleaned off; if it be in oil, clean off with fine flour; if in water, with sponge and wash leather and water, taking care not to scratch. A clean damp chamois or wash leather will now be required, which must be held in the left hand, leaving the right perfectly clear. Now use the ball of the right hand, press gently upon the panel, and draw it forwards or towards you. If this be done properly, it will bring up a clear polish upon the work. The hand should be kept slightly damp by drawing it across the leather almost every time the hand is drawn forward. If this be done effectually, a rustling sound will be produced while the hand is in motion; if this be so, the polish will be sure to follow. The polish thus produced on the filling alone will be of the kind we have spoken of above, and will not be at all objectionable to even the most fastidious taste; but if the work has to be finished with a brilliant luster and to a high degree of polish, it will, after being cut down with the pumice and felt, have to be coated with two or more coats of the best polishing copal varnish, having a quantity of the best flake white from the tube; this should be mixed with the varnish in sufficient quantity to form a creamy mixture, with which the work must be coated—one, two, or three coats, as may be desirable. This should stand for three or four weeks, until it becomes hard, for the harder it is, the better it will polish. It must then be cut down with felt and the finest ground pumice stone in water, and polished with the rotten stone, as before described. By this means a bright and brilliant polish may be obtained, of a very enduring nature. The same process will of course answer for all varnished imitations of wood and marbles, and all work which will admit of the application of oil varnishes.

ENGRAVING in Alto-Relievo.—In the common operation of engraving, the desired effect is produced by making incisions upon the copper-plate with a steel instrument of an angular shape, which incisions are filled with printing-ink, and transferred to the paper by means of a roller, which is passed over its surface. There is another mode of producing these lines or incisions, by means of diluted nitrous acid, in which the impression is taken in the same way. Another method of engraving is done upon a principle exactly the reverse, for instead of the subject being cut into the copper, it is the interstice between the lines which is removed by diluted aquafortis, and the lines are left as the surface, from which the impression is taken by means of a common type-printing press, instead of a copper-plate press.

This is effected by drawing with common turpentine varnish, covered with lampblack, whatever is required upon the plate; and when the varnish is thoroughly dry, the acid is poured upon it, and the interstice of course removed by its action upon the uncovered part of the copper. If the subject is very full of dark shadows, this operation will be performed with little risk of accident, and with the removal of very little of the interstice between the lines; but if the distance between the lines is great, the risk and difficulty is very much increased, and it will be requisite to cut away the parts which surround the lines with a graver, in order to prevent the dabber with the printing-ink from reaching the bottom, and thus producing a blurred impres-

sion. It is obvious, therefore, that the more the plate is covered with work, the less risk there will be in the preparation of it with the acid, after the subject is drawn, and the less trouble will there be in removing the interstice, if any, from those places where there is little shading.

ENGRAVINGS, To Clean.—It has been found that ozone bleaches paper without injuring the fiber in the least. It can be used for removing mildew and other stains from engravings that have been injured by hanging on the walls of damp rooms. The engravings should be carefully moistened and suspended in a large vessel partially filled with ozone. The ozone may be generated by putting pieces of clean phosphorus in the bottom of the vessel, partially filled with water, or by passing electric sparks through the air in the vessel.

ETHER, To Wash.—1. This operation is for the removal of alcohol, and may be done by agitating with twice the bulk of water, which will unite with the alcohol, forming a heavier stratum from which the ether may be poured off. The ether will absorb ten per cent. of the water, which can be removed by agitation with freshly burnt lime and subsequent distillation.—2. Turn the ether and water into a glass funnel, while you hold a finger to the end to prevent anything from running out. The ether rises to the top, the water and residue fall to the bottom. Take away your finger from the funnel and let the water out; then save your ether. It is almost as simple as saving washed oil.

EYES (Sore), To Cure.—Take a potato, and after quartering it, grate the heart as fine as possible, and place the gratings between pieces of cambric muslin. Place the poultice over the eyes inflamed, and keep it there fifteen minutes. Continue the operation three successive nights and a perfect cure ensues.

FEATHER PILLOWS.—If a person sleeps on his back, no pillow is needed. If one sleeps upon the side, a pillow should be used thick enough to support the head in a direct line with the body. No more. Curled hair is one of the best materials for pillows. Feathers should never be allowed about a bed in any form. For pillows they are especially injurious, as they partly surround the head and keep it overheated, which weakens the scalp and produces a tendency to falling out of the hair, congestion of the head and headache. Then again, the effete emanations that are always being thrown off from the feathers are taken direct into the lungs with the inspired air.

FERNS, To Raise from Seed.—Procure some bricks or stones—bricks would be best, as they have an even surface, and are also porous, rendering them capable of holding water. These would be best if found covered with moss which has naturally grown on them. If not thus covered, it can be very easily done. The moss must not be thick; it can be clipped with a pair of scissors if thick, and well washed before using, to get rid of any seeds that may have fallen into it. These bricks should be placed into the pot or pan, so that their upper surface may come level with the soil used to steady them and fill up the pot. Sow the spores in the moss, and with a pepper dredge dust over the moss very lightly with burnt soil, and then with a very fine rose watering-can, wash down the soil and spores into the moss. Place the pot into a saucer of water,

which must be kept full. Place a bell-glass over; those which have a hole in them near the top I prefer, as they prevent damping, affording an escape to the great evaporation which takes place; they can be left alone for a week without disturbance. There will be no necessity for surface watering until the seedlings appear; even then it is not advisable, if soaking the pot up to the rim can be quickly done. I should before have said that the bottom of the pot should be filled one-third of its depth with broken crocks. The pot should not see the sun until the seedlings are well up; even then shade is necessary. The soil used should be previously burnt, otherwise numberless seedlings will appear, which will choke those wanted, and be a cause of mischief in the operation of weeding. This plan I have proved, and can recommend it.

FEVER and AGUE, To Cure.—A new and simple remedy is common salt. A teaspoonful taken in water and a teaspoonful deposited inside the stocking next the foot as the chill is coming on. That's all there is of it; but, knowing that it has been efficacious in "breaking" the chill and perfecting a cure, we here insert it.

FIRE ANNIHILATOR, (Philips').—This consists of a mixture of twenty parts charcoal, sixty nitre, and five gypsum, boiled together in water, and subsequently moulded into a cylindrical brick. Down the axis of this there is a cavity for the reception of a phial containing a mixture of chlorate of potash and sugar, surrounded by a globule of sulphuric acid. By pushing down a rod the glass containing the acid is broken and the mixture inflamed. The composition is placed in an iron perforated vessel, and gives out a volume of gases which extinguish the fire.

FIRE KINDLERS.—Take a quart of tar and 3 pounds of resin, melt them, bring to a cooling temperature, mix with as much sawdust, with a little charcoal added, as can be worked in; spread out while hot upon a board, when cold break up into lumps of the size of a large hickory nut, and you have, at a small expense, kindling material enough for a household for one year. They will easily ignite from a match and burn with a strong blaze, long enough to start any wood that is fit to burn.

FIRES, Colored.—1. White light: 8 parts saltpetre, 2 parts sulphur, 2 parts antimony.

2. Red light: 20 parts nitrate of strontia, 5 parts chlorate of potash, $6\frac{1}{2}$ parts sulphur, 1 part charcoal.

3. Blue light: 9 parts chlorate of potash, 3 parts sulphur, 3 parts carbonate of copper.

4. Yellow light: 24 parts nitrate of soda, 8 parts antimony, 6 parts sulphur, 1 part charcoal.

5. Green light: 26 parts nitrate of baryta, 18 parts chlorate of potash, 10 parts sulphur.

6. Violet light: 4 parts nitrate of strontia, 9 parts chlorate of potash, 5 parts sulphur, 1 part carbonate of copper, 1 part calomel.

FIREWORKS, Sulphide of Cadmium in.—In the following composition it is said that sulphide of cadmium gives a white flame, which is surrounded by a magnificent blue margin: Saltpetre, 20 parts; sulphur, 5; sulphide of cadmium, 4; powdered charcoal, 1.

FIREWORKS, Iron Sand in.—Used to give corruscations in fireworks; is far better than iron or steel-filings. It is made by beating cast steel or iron into small pieces on an anvil. These are

sifted into 4 sizes, the smallest for the smallest pieces; and vice versa. The corruscations produced by these are exceedingly brilliant. The sand should be kept in a dry place in a well-closed bottle, as any rust damages it. Fireworks containing it should not be made very long before using.

FIREWORKS, To Represent Cordage in.—Antimony, 1 part; juniper resin, 1 part; nitre, 2 parts; sulphur, 16 parts. Mix, and imbue soft ropes with the composition.

FIREWORKS, Touch-Paper for.—Soak unglazed paper in a solution of nitre in vinegar or water. The stronger the solution, the faster will it burn. A good plan is to dip it in a weak solution, dry it, try it, and if it burns too slowly, make the solution stronger and dip it again.

FIREWORKS, Quick Match for.—Is made by immersing lamp-wick in a solution of saltpetre with meal powder, winding it on a frame, and afterwards dusting with meal powder. To 1 lb. 12 oz. of cotton, take saltpetre, 1 lb.; alcohol, 2 quarts; water, 3 quarts; solution of isinglass (1 oz. to the pint), 3 gals.; meal powder, 10 pounds.

FIREWORKS, Port Fires.—Take of sulphur, 2 parts; saltpetre, 6 parts; meal powder, 1 part. This is rammed into cases of from 6 inches to 2 feet long, and $\frac{1}{2}$ inch internal diameter. They should be lightly rammed. To give a brilliant flame, add 1 part of iron sand; for a dark flame, 1 part of powdered charcoal.

Stars.—(Common.)—Saltpetre, 1 lb.; sulphur, $4\frac{1}{2}$ oz.; antimony, 4 oz.; isinglass, $\frac{1}{2}$ oz.; camphor, $\frac{1}{2}$ oz.; alcohol, $\frac{1}{2}$ oz.—(White.)—Meal powder, 4 oz.; saltpetre, 12 oz.; sulphur, $6\frac{1}{2}$ oz.; oil of spike, 2 oz.; camphor, 5 oz. The above are to be made into balls, rolled in grained powder and dried in the sun. Used in Roman candles, rockets, etc.—**Trailed Stars.**—Saltpetre, 4 oz.; sulphur, 6 oz.; sulphate of antimony, 2 oz.; rosin, 4 oz.—(With Sparks.)—Meal powder, 1 oz.; saltpetre, 1 oz.; camphor, 2 oz.

Colored Stars.—May be made by using any of the receipts for colored fires, with a solution of isinglass, $\frac{1}{2}$ oz.; camphor, $\frac{1}{2}$ oz.; alcohol, $\frac{1}{2}$ oz. Make into balls of the requisite size, roll in gunpowder, dry in the sun.

Roman Candles.—Meal powder, $\frac{1}{2}$ lb.; saltpetre, $2\frac{1}{2}$ lbs.; sulphur, glass dust, each, $\frac{1}{2}$ lb. This is rammed in cases as follows: Put at the bottom of the case a small quantity of clay, then some gunpowder, then a wad of paper, then $\frac{1}{8}$ of the height of the case of the composition, then a wad and powder and a star or ball, then more composition, and so on till the case is filled. The wads must be loose (only to prevent the mixing of the composition and gunpowder), and the ramming should not be begun until the case is $\frac{1}{3}$ filled, and then should be gentle lest the stars be broken.—**Chinese Fire.**—(Red.)—Saltpetre, 1 lb.; sulphur, 3 oz.; charcoal, 4 oz.; iron sand, 7 oz.—(White.)—Saltpetre, 1 lb.; meal powder, 12 oz.; charcoal, $7\frac{1}{2}$ oz.; iron sand, fine, 11 oz.—**Golden Rain.**—Meal powder, 4 oz.; saltpetre, 1 lb.; sulphur, 4 oz.; brass filings, 1 oz.; sawdust, $2\frac{1}{4}$ oz.; glass powder, 6 drs.—**Silver Rain.**—Meal powder, 2 oz.; saltpetre, 4 oz.; sulphur, 1 oz.; steel-dust, $\frac{3}{4}$ oz.—**Wheel Cases.**—Meal powder, 2 lbs.; saltpetre, 4 oz.; steel filings, 6 oz.—**For Rockets.**—(Four-Ounce.)—Meal powder, 1 lb.; charcoal, 1 oz.; saltpetre, 4 oz.—(Eight-Ounce.)—Meal

powder, 1 lb. 1 oz.; saltpetre, 4 oz.; sulphur, 3½ oz.; charcoal, 1 oz.—(*One-Pound.*)—Mealed powder, 1 lb.; charcoal, 3 oz.; sulphur, 1 oz.

FLOUR, PATENT, To Make.—Patent Flour for bread making has enjoyed a certain degree of popularity for obtaining bread without the necessary delay of fermentation. Some of the many devices for this purpose, it is alleged, produce very satisfactory results both in point of economy and for the quality of the food when served up on the table. In England there is a flour known as Jones' Patent Flour, which is highly approved for the excellence of the bread it yields, and the readiness with which it can be employed. The directions for proceeding with it are after the following fashion:—

Take Kiln-dried Flour 1 cwt.
Tartaric acid 10½ ounces.
Mix well, and after a few days add of
Bicarbonate of soda 12 ounces.
Lump sugar ½ pound.
Common salt 1½ "

Unite the whole by passing through a sieve. It is important that all of the ingredients be perfectly dry, and reduced, separately, to a very fine powder. Simply mixing this flour with cold water, and baking at once, you will have a light, porous, and a fine-flavored biscuit or loaf. The chief advantage, however, is the extemporaneous facility with which bread may be prepared from it without the loss of time caused by "setting a sponge," and the final uncertainty of having it free from heaviness or acidity. Though it may be slightly irrelevant to the question about flour, we will just subjoin to the foregoing remarks, that in bread-making a pound of best thoroughly dried flour will need about nine fluid ounces of water to make it into good dough fit for baking. In using fresh baker's bread we eat more water than is usually suspected. The bread may have indeed full weight, but then too much of it comes from the well. A great fault of the bread of this city is that it never is more than half enough cooked. It is like a sponge soaked with water. As food it is detestable. There is frequently, we are sure, in the bread on the breakfast table which has but just been hurried from the baker's oven, at least one-fourth of its weight of water. It is literally water-logged, and is in such a state that it can be quickly formed into a bolus in the mouth without the aid of saliva. Thus it falls like a stone into the stomach, and this much-abused organ is needlessly worried for many hours before the food is reduced to a fit condition for the last change into blood. All starchy food should undergo preparation in the mouth, by being mixed with saliva in the process of mastication, for its ready and perfect transformation when it shall come under the influence of the gastric fluid. Water-soaked bread or half-dissolved rice is therefore in most unsuitable condition for making wholesome and easily digested aliment. The rule for cooking starchy food should be to have it subject to the fire until most of the water is driven away, so that the fluid of the mouth will be necessary to incorporate the mass into a proper ball which can be swallowed without the danger of choking.

FLOWERS, To Obtain from Bulbous Roots in Three Weeks.—Put quicklime into a flower-pot till it is rather more than half full; fill up with good earth; plant your bulbs in the usual

manner; keep the earth slightly damp. The heat given out by the lime will rise through the earth, which will temper its fierceness; and in this manner beautiful flowers may be obtained at any season.

FLOWERS, To Obtain Fresh-Blown in Winter.—Choose some of the most perfect buds of the flowers you would preserve, such as are latest in blowing and ready to open; cut them off with a pair of scissors, leaving to each, if possible, a piece of stem about three inches long; cover the end of the stem immediately with sealing wax, and when the buds are a little shrunk and wrinkled, wrap each of them up separately in a piece of paper, perfectly clean and dry, and lock them up in a dry box or drawer; and they will keep without corrupting. In winter, or at any time when you would have the flowers blow, take the buds at night and cut off the end of the stem sealed with wax, and put the buds into water wherein a little nitre or salt has been diffused, and the next day you will have the pleasure of seeing the buds open and expanding themselves, and the flowers display their most lively colors and breathe their agreeable odors.

FOSSILS, To Preserve the Form of.—Fossils are often so friable that they fall to pieces on the slightest handling. To make such remains coherent saturate them in a solution of silicate of potash.

FURNACES, Prevention of Smoke in.—The theory of the prevention of smoke is very simple; it is only necessary to secure the burning of the gases, instead of letting them escape, unconsumed, up the chimney; and in every invention which has yet been brought forward, the object sought to be achieved is the passage of the products of the newly supplied coal over that which is already a bright red. One class of inventors has endeavored to accomplish this by turning the gases back with a deflector placed behind the fire; another has employed two furnaces, and fed them alternately; and the third has supplied additional fresh air so as to mix with the deleterious gases, and facilitate their burning to an incandescent mass. Now, all these automatic arrangements are rendered unnecessary if the stoker exercises ordinary care. All he has to do is to well push back the red hot coals in the furnace, and feed the fresh coal near the mouth; and, consequently, manufacturing companies have found that they only had to give the men two shillings extra upon their week's pay if they avoided making smoke, and fine them one shilling if they made smoke, to insure an entire absence of the nuisance, and increased economy in the use of coal—an important consideration, especially in cases where large quantities are used.

FURNITURE, Varnished.—This may be finished so as to look equal to the best French polished wood, in the following manner: Take two ounces of tripoli, powdered; put it into an earthen pot, with just enough water to cover it; then take a piece of white flannel, lay it over a piece of cork or rubber, and proceed to polish the varnish, always wetting it with the tripoli water. It will be known when the process is finished by wiping a part of the work with a sponge, and observing whether there is a fair, even gloss. When this is the case, take a bit of mutton suet and fine flour, and clean the work. The above process is suitable to other varnished surfaces.



GAS METER, To Read.—The figures on the index at the right hand denote even hundreds. When the hand completes the entire circle it denotes ten hundred, and is registered by the hand in the centre circle, pointing to one—each figure in the centre circle being a thousand—this entire circle being ten thousand; and is registered on the index of the left hand circle by the hand, there denoting by each figure, ten thousand.

The quantity of gas which passes through the meter, is ascertained by reading from the index at the time the amount is required to be known, and deducting therefrom the quantity shown by the index at a previous observation.

If the whole is registered by the hands on the three circles above, it indicates . . . 49,900
Amount at previous observation, as shown by the dotted lines . . . 42,500

Shows amount which passed through since last taken off . . . 7,400

The register at all times shows the quantity that has passed through since the meter was first set, by deducting from which the amount that has been paid for (without any regard to the time when), shows that the difference remains unpaid.

GAS-BURNERS.—The following are those in common use:

Batswing.—This has a single slit at the top of the burner. It is very steady; does not change its form under any pressure. It is, therefore, used in street lamps. It is not, however, economical.

Fish-tail.—This form is generally used in houses; it has two openings in the top, from which the jets of gas issue and form a flat flame, the plane of which is at right angles to that of the openings. When the pressure is too great the flame elongates and sings, thus calling attention to the waste. It is an economical burner, but flickers. This unsteadiness is trying to the eyes, and the fish-tail should never be used to read or write by.

Argand.—These are the steadiest and most economical burners, but require a chimney. The gas is allowed to escape by a ring of holes, and the air is admitted both inside and outside of this ring. In the patent Argand the outer ring of air passes through a series of small openings, and the inner ring is deflected into the flame by a button; it requires a swelled chimney. By cutting off the button a steadier light is obtained, and the economy is nearly the same; straight chimneys are more easily obtained than the others. The best flint-glass chimneys are in the end the cheapest; great loss of light ensues if they are not kept clean. But putting a chimney into hydrant-water, and gradually heating it, it may be cleaned safely; paper gives the best finish. The larger the burner the greater the relative economy.

GAS, To Avoid Waste of.—Turn the gas

partly off at the meter; much gas is burned to waste by too great pressure in certain localities. In buildings of any size a good regulator will soon pay for itself.

GAS, Tests for Impurities in.—**Sulphureted Hydrogen.** Dissolve a small quantity of acetate of lead, commonly called sugar of lead, in distilled or rain water, until the mixture is about the consistency of cream; dip into it a piece of writing paper, which hold a minute or two over a jet of gas (unlighted); if the paper be not discolored, the gas may be considered pure; but if a brown stain be imparted to it, the lime in the purifiers should be renewed. This test will detect the presence of sulphureted hydrogen in gas, if it contain one part in 20,000. As this preparation of lead is an active poison, it should be used with caution, and labeled. A solution of nitrate of silver and distilled water is a more delicate test than the above.—**Ammonia.** Apply either litmus paper or yellow turmeric paper reddened by vinegar, or any other weak acid, to a jet of gas, as above; if the blue color of the litmus paper return, or the color of the turmeric paper deepen to a brown, the gas contains a proportionate amount of ammonia.—**Carbonic Acid.** This may be detected by adding to water impregnated with the gas a few drops of sulphuric acid, when minute air bubbles of carbonic acid gas will be rapidly disengaged. Another test is to pass the gas through a solution of pure barytes in the blue tincture of litmus, when, if carbonic acid be present, carbonate of barytes will be precipitated.—**Atmospheric Air.** The presence of atmospheric air in gas can be readily detected by collecting a portion of the gas over mercury, and then passing up, first a few drops of caustic potassa, and afterwards a drop or two of a solution of pyrogallie acid. If the liquid assume a blood red hue, oxygen, indicating the presence of atmospheric air, is mixed with the gas.—**Bisulphide of Carbon.** By forcing, by means of an ordinary blowpipe, the flame of coal gas, for about a minute, on to distilled water containing a little acid chloride of barium, sulphate of baryta is formed, and the presence of sulphur in the gas thus proved.

GAS (Laughing), To Make.—Heat gently in a flask or retort, nitrate of ammonia (made by adding carbonate of ammonia to nitric acid until no more gas comes off). It should be allowed to stand some time over water before being breathed.

GAS-TAPS, To Stop the Leakage of.—Many people are annoyed by the slight leakage of taps, causing offensive odor deleterious to health in the apartments where they are placed, and also increasing their bills. In many cases they may easily remedy the evil without sending for a plumber or gas-fitter. To do this they should turn off the gas back of the meter; then take out (a screw driver is all the tool required) the plug. Next light a wax, sperm, or paraffine candle, and drop the melted wax, sperm, or paraffine upon the surface of the plug, till it is covered with a thin layer. Next, screw in the tap, and in nine cases out of ten the leak will be stopped, and remain stopped.

GALLEIN, (A New Dye).—The crystals of gallein are first produced, and these are converted into gallin by means of zinc and dilute sulphuric acid. On subsequently treating the gallin with concentrated sulphuric acid at 200° C.,

a substance named *cörolein* is obtained. This dissolved in aniline forms a rich indigo blue, and with alkalis it gives a fine green, while, if mordanted with iron compounds, a fine brown is imparted to the goods. These colors are readily imparted to cloth, and are of considerable permanence, resisting the action of soap.

GEARING and PULLEYS, To Compute the Speed of.—The following simple rule for calculating the speed of gearing or pulleys is, doubtless, in familiar use by many mechanics. We give it, however, for the convenience of those of our readers who may not happen to be acquainted with it, and who have found the need, in practice, of a uniform rule, applying to all cases. To find the speed of a driven wheel, when the number of teeth of both wheels and the number of revolutions of the driving-wheel are given: Multiply the number of teeth of the driving-wheel by the number of its revolutions; divide its product by the number of teeth of the driven wheel, and the quotient will be the number of revolutions of the driven wheel. For example: an 80-cog spur-wheel on a water-wheel shaft making 85 revolutions per minute, and driving a 34-cog pinion; to find the speed of the pinion, multiply 80, the number of cogs of the driving-wheel, by 85, the number of revolutions, and the product is 6800. Divide this product by 34, the number of cogs in the pinion or driven wheel, and the quotient is 200, the number of revolutions of the pinion per minute. To reverse the rule: The number of teeth and number of revolutions of the driving-wheel and the number of revolutions of the driven wheel being given, to find the number of teeth of the driven wheel. In the case above supposed, multiply 80 (number of cogs of spur-wheel) by 85, (number of its revolutions) and divide the product, 6800, by 200, the number of revolutions of the pinion per minute; the quotient, 34, is the number of teeth of the pinion or driven wheel. In calculating the speed of pulleys, the same rule is adopted, except that the diameter of the wheel or pulley is used in place of the number of teeth. The speed of the driving-wheel being multiplied by its diameter, the product is divided by the diameter of the driven pulley, and the quotient is the number of revolutions of the pulley; or if the same product be divided by the number of revolutions of the pulley, the quotient will be the diameter of the pulley.

GERANIUMS, To Preserve During Winter.—Take the plants to be preserved out of their pots, trim off the leaves and outer branches, and then take off all the soil from the roots, tie them up in bunches, and hang them, roots upward, in a dark, dry cupboard, loft, or cellar, where no frost can touch them. In the spring bring them out, and having well cleaned your pots inside and out, re-pot them in some good compost.

GINGER, Tincture of.—Take of ginger, in coarse powder, 2 ounces; proof spirits, 2 pints. Digest in a gentle heat for 7 days, and strain. This tincture is cordial and stimulant, and is generally employed as a corrective to purgative draughts.

GILDERS' GLUE.—Rabbit-skins are cut into thin strips like vermicelli, and subjected in a vessel to a bath of boiling water. They are then poured into a kind of basket, pierced at the bottom like a cullender; the skin remains at the

bottom, and the juice flows into a reservoir placed underneath. A solution of sulphate of zinc with alum, in pure water in ebullition, is then made separately, consisting of about 100 grammes of the sulphate to 25 of the alum. This solution is poured on the yet warm juice of the skin in the reservoir, and well mixed together. The juice is then passed through a strainer, and from thence into a rectangular box, of the form of soap-bars. In this box the juice coagulates in about 24 hours in winter and 48 hours in summer. Then with a sharp instrument the coagulated bar is detached from the box, cut transversely in two lengths, and each half bar is placed in a receptacle where it is submitted to the action of several cutters, which form it into thin sheets. These sheets are extended on strings to dry in the open air, or in an oven, according to the season. The size of these sheets of skin glue is about two inches, and their color very light chestnut, the traces of the strings and knots appearing lozenge-shaped upon them.

GLASS or CHINA, To Pack.—Procure some soft straw or hay to pack them in, and if they are to be sent a long way, and are heavy, the hay or straw should be a little damp, which will prevent them slipping about. Let the largest and heaviest things be always put undermost, in the box or hamper. Let there be plenty of straw, and pack the articles tight; but never attempt to pack up glass or china which is of much consequence, till it has been seen done by some one used to the job. The expense will be but trifling to have a person to do it who understands it, and the loss may be great if articles of such value are packed up in an improper manner.

GLASS (Ground) Stopple, To Loosen.—Hold the hand around the neck of the bottle, 10 or 15 seconds, until its warmth expands the glass of the bottle—when the stopple will move easily. If it does not, try a higher heat by the aid of a rag dipped in hot water and wrapped around the neck of the bottle for a minute or so. Another way is to hold the neck of the bottle, cautiously turning it, so as not to expose any part to much or too sudden a heat, near or over a gas jet or heat from a lamp.

GLASS, To Platinize.—Pour rosemary oil upon the dry chloride of platinum in a porcelain dish, and knead it well until all parts are moistened; then rub this up with five times its weight of lavender oil, and leave the liquid a short time to clarify. The objects to be platinized are to be thinly coated with the above preparation and afterwards heated for a few minutes in a muffle or over a Bunsen burner.

GLASS, To Write or Draw on.—The process of writing or drawing on glass can be done by procuring some French chalk; place the glass on a table, and while breathing on it, write with the chalk, after that wipe it with a damp cloth; when dry the drawing will disappear; breathe on it again and it will return.

GLAZING (Common), For Earthenware.—Take of white sand, 40 lbs.; red lead, 20 lbs.; pearlash, 20 lbs.; common salt, 12 lbs. Powder this sand by grinding before it be mixed with the other ingredients, and then grind them together, after which, calcine them for some time with a moderate heat, which must be less than will make them melt and run to glass; and when the mixture is cold, grind it to powder

again, and, when wanted, temper it with water and it will then be fit for use.

The proportions of these ingredients may be varied occasionally, for, where the glazing can be fluxed conveniently with a very strong fire, the quantity of sand may be increased to 60 or 70 lbs., which not only renders the glazing stronger, but makes a saving in the expense. The proportion of pearlashes may likewise be diminished, or they may be wholly omitted where the ware is designed for very coarse purposes, and not for domestic uses, where the lead is very improper, being extremely apt to be corroded by acids, and to produce a very unwholesome substance. On this account, where good manufactories are established, the lead ought to be excluded from the composition of the glazings, and other fluxes used in its stead, as in the following:

GLAZING (Transparent), For Earthenware.—Take of white sand, 40 lbs.; of pearlash, 21 lbs.; and of common salt, 15 lbs. Calcine, and proceed as above.

Where the expense is no object, this glazing may be improved by adding 1 or 2 lbs. of borax, and diminishing the pearlash in the proportion of 6 lbs. for 1 lb. of borax added, or 10 lbs. for 2; in the latter case, 2 lbs. of salt may be also kept out of the composition. The reason for this change is, that if the composition contain so large a proportion of salt, and the glazing be not fluxed for a long time after it is laid on the ware, it will be apt to be dissolved by boiling water, and peel off, if it be exposed to the action of it for any long time.

Another.—Take of sand, 40 lbs.; of wood-ashes, perfectly burnt, 50 lbs.; of pearlash, 10 lbs.; of common salt, 12 lbs.

This will make an admirable glazing, where the ashes are pure, and a strong fire can be given to flux it when laid on the ware. It will be perfectly free from the imperfection of the above, and will be very hard and glossy, and where the expense can be afforded, it may be made more yielding to the fire by the addition of borax, in which case no alteration need be made in the proportion of the other ingredients.

GLAZING, Fine Blue.—Take of red lead, 1 lb.; powdered flints, 2 lbs.; common salt, 2 lbs.; tartar, 1 lb. Calcine till it is almost white. White flint-glass, $\frac{1}{2}$ lb., and zaffre, $\frac{1}{2}$ lb. Fuse the whole mixture, and quench the melted mass in water. Repeat the same operation several times. The same proceeding must be adhered to in all the compositions where the tartar enters, otherwise they would be too much charged with salt, and the color would not prove fine. It is proper, moreover, to calcine the mixture gently day and night, for 48 hours, in a glass-house furnace.

Another.—Take 1 lb. of tartar, $\frac{1}{4}$ lb. of red lead, $\frac{1}{2}$ oz. of zaffre, and $\frac{1}{4}$ lb. of powdered flints. Fuse the whole, and proceed in the manner stated above.

GLAZING, Green (To be Laid on a White Ground).—Take of calcined copper 1 part, and 2 parts of any of the common yellow glazings. Fuse them twice, but when the composition is used it must not be laid on too thick, for that would render the color too deep.

GLAZING, Lemon-Colored.—Take of red lead, 3 parts; of powdered bricks, very red, $3\frac{1}{2}$ parts; and of antimony, 1 part. Calcine the mixture day and night, for the space of 4 days, in the ash-hole of a glass-house furnace. Urge

it at last to fusion, and it will produce a very fine lemon-colored glazing.

The success of this operation depends greatly on the fineness of the color of the bricks that are powdered. Those which are of a fine red and very brittle, are the best; but such as are gray will not at all answer the end. The same attention should be paid to this matter wherever bricks are used in this kind of preparations.

GLAZING, Light Yellow.—Take of red lead, 4 parts; of antimony, 3 parts; of the mixture of the calxes of lead and tin, before mentioned in the masticot for white enamel, 8 parts; and of glass, 3 parts.

When the red lead and calx of tin are used, the proportion of the ingredients will be of red lead, 10 parts; of antimony and glass, each, 3 parts; and of calcined tin, 2 parts.

GLAZING, Violet-Blue.—Take 12 parts of tartar and an equal quantity of flints and zaffre. Proceed as with the above.—*Another.*—Take 4 oz. of tartar, 2 oz. of red lead, 5 oz. of powdered flints, and $\frac{1}{2}$ dr. of magnesia. Proceed as with the above.

GOLDBEATERS' SKIN.—Is prepared by extending the peritoneal membranes of the cecum, and washing them, first with plain water, and then with a solution of alum, and afterwards with a solution of isinglass and spices.

GRASS, To Crystallize.—Having secured the grass during the summer and fall months, and dried it in a dark room, procure one-half pint of white spirit varnish, and 1 oz. of white frosting; dip the blades of grass into the varnish separately; and immediately sprinkle on the powdered frosting; then put it away carefully to dry.

GRASS, To Prevent Growing in a Paved Yard.—Pour boiling water over the stones whenever the grass shows itself.

GREEN-HOUSE, or Conservatory, To Make.—The depth of green-houses should never be greater than their height in the clear; which, in small or middling houses may be sixteen or eighteen feet, but in large ones from twenty to twenty-four feet; and the length of the windows should reach from about one foot and a half above the pavement, and within the same distance of the ceiling.

The floor of the green-house, which should be laid either with Bremen squares, Purbeck stone, or flat tiles, must be raised two feet above the surface of the adjoining ground, or, if the situation be damp, at least three feet; and if the whole is arched with low brick arches under the floor, they will be of great service in preventing damp; and under the floor, about two feet from the front, it will be very advisable to make a flue of ten inches wide, and two feet deep; this should be carried the whole length of the house, and then returned back along the hinder part, and there be carried up into funnels adjoining to the tool-house, by which the smoke may be carried off. The fire-place may be contrived at one end of the house, and the door at which the fuel is put in, as also the ash-grate, may be contrived to open into the tool-house.

Whilst the front of the green-house is exactly south, one of the wings may be made to face the southeast, and the other the southwest. By this disposition the heat of the sun is reflected from one part of the building to the other all day, and the front of the main green-house is guarded

from the cold winds. These two wings may be so contrived as to maintain plants of different degrees of hardness, which may be easily effected by the situation and extent of the fire-place, and the manner of conducting the flues.

The sloping glasses of these houses should be made to slide and take off, so that they may be drawn down more or less in warm weather to admit air to the plants; and the upright glasses in the front may be so contrived as that every other may open as a door upon hinges, and the alternate glasses may be divided into two; the upper part of each should be so contrived as to be drawn down like a sash, so that either of them may be used to admit air in a greater or less quantity, as there may be occasion. As to the management of plants in a green-house, open the mould about them from time to time, and sprinkle a little fresh mould in them, and a little warm dung on that; also water them when the leaves begin to wither and curl, and not oftener, which would make them fade and be sickly; and take off such leaves as wither and grow dry.

GRINDSTONES, Artificial.—Washed siliceous sand 3 parts; shellac 1 part; melt, and form it into the proper shape while warm. The fineness of the sand must depend on the work the stone is intended for. Powdered emery may be substituted for sand. The same composition is formed upon pieces of wood, for the purpose of sharpening knives, and cutting stones, shells, etc.

GRINDSTONES, Use of.—The periphery of every grindstone on which edge-tools are ground should run as true as the dressed surface of a millstone, as it is impracticable to grind a tool correctly on a stone that revolves with an uneven motion. If the periphery of a stone varies half an inch in each revolution, the most expeditious way to put it in order is to loosen the wedges with which it is keyed to the journal, and rehang it. Then secure the bearings of the journal, so that they cannot be easily lifted out of the boxes, and turn the periphery off true and smooth. Let a firm rest be fixed close to the periphery before attempting to turn off the prominent portions. The rest must be solid with the surface close to the stone, so that when the turning instrument comes in contact with the stone, it will remove a thin chip without springing away from the stone. Stone-turners always employ for a turning-tool the end of a bar of very soft iron, drawn out to a point, and turned up at the end for gouging. A piece of soft iron is far more effective than steel.

It is recommended to tar the center of grindstones, in order to compel those who grind upon them, to grind on the edges, forming a raised center, which gives a better opportunity to put a good edge on a tool, than a level surface does. The ring of tar should be quite narrow, and all who grind are compelled to use the edges of the stone, as they cannot grind where the tar is. This remedy should be tried where farm hands will not heed your request to wear the stone off the edges.

GUN COTTON.—Mix three parts of sulphuric acid, spec. grav., 1.85, with one part of nitric acid, spec. grav., 1.45 to 1.50; and when the mixture cools down to between 50° and 60° Fahr., clean rough cotton, in an open state, is dipped in it; let soak, then pour off the excess of acid, and press the cotton tightly to remove

as much as possible of what remains. Then cover the cotton and let stand for half an hour; press again, and thoroughly wash in running water. Partially dry it by pressure, then wash in a solution made by dissolving one ounce of carbonate of potash in a gallon of water. Press again, so that the cotton will be nearly dry; then wash in a solution of pure nitrate of potash, one ounce to the gallon of water, and again press, after which dry at a temperature of from 150° to 170°. Its projectile force is equal to about twice its weight of the best gunpowder, and on account of its quickness of action, can hardly be used with safety.

GUNPOWDER.—Gunpowder is made by carefully grinding and mixing 75 parts willow or birch charcoal, 15 parts saltpetre and 10 parts brimstone.

A cheap gunpowder in which charcoal is replaced by common glue is thus prepared: The glue or gelatin is first soaked in cold water, and then heated in diluted nitric acid until it dissolves. It is next evaporated to dryness, re-dissolved in water, and then carbonate of baryta is added to neutralize the acid. The solution is again evaporated, one part of sulphur and six parts of nitrate of potash for every two parts of glue being incorporated as the evaporation proceeds. This gives a slow burning powder which may be rendered more energetic by replacing nitrate by chlorate of potash.

GUTTA-PERCHA (Pure White), Preparation of.—This substance is now much used in dentistry and for other purposes; and as different qualities, some of them very inferior, are in the market, many of our professional readers may thank us for the details of a simple process for manufacturing it. Four ounces of the purest gutta-percha that can be selected are to be digested for several days with five pounds methyl chloroform until a solution is obtained thin enough to pass through filtering paper, care being taken during the operation to prevent any loss of the chloroform by using the apparatus constructed for that purpose. The solution is then to be filtered (an additional pound of chloroform will facilitate this), and should then be clear and nearly colorless. Alcohol is now to be added in sufficient quantity to precipitate the gutta-percha in a voluminous white mass, which then is to be washed with alcohol, pressed in a cloth, and dried in the air. It must finally be boiled in water in a porcelain vessel for half an hour, and while still hot rolled into sticks. The chloroform can be separated from the alcohol by adding water, and the alcohol recovered by distillation.

GUTTA-PERCHA and RUBBER, To Utilize the Waste of.—The waste is cut into small pieces, and 100 pounds of the same are placed in a well-closed boiler, with 10 pounds of bisulphide of carbon and 4 ounces absolute alcohol, well stirred; then the boiler is closed, and left a few hours to soak. After this time it is found to be changed into a soft, dough-like mass, which, after being ground or kneaded, is fit to be formed into any shape, when the solvent will evaporate. If too much of the latter has been used, a thick, unmanageable liquid is obtained. This process was patented in England some sixteen years ago.

HARNESS, Varnish for.—Half a pound India rubber, one gallon of spirits of turpentine, dissolve by a little heat to make it into a jelly,

then take equal quantities of hot linseed oil and above mixture, and incorporate them well on a slow fire.

HATS (Panama), How Made.—The process of making Panama hats is as follows:—The leaves of the pandanus, or Seren pine, from which these hats are made, are gathered before they unfold, the ribs and coarser veins are removed, and the rest, without being separated from the base of the leaf, is reduced to shreds. After having been put in the sun for a day and tied into a knot, the straw is immersed in boiling water until it becomes white. It is then hung up in a shady place, and subsequently bleached for two or three days, after which the straw is ready for use. The plaiting of the straw commences at the crown and finishes at the brim, and is a very troublesome operation. The hats are made on a block placed on the knees, and require to be constantly pressed with the breast. The coarser hat may be finished in two or three days, but the finest may require as many months.

HARP (Æolian), To Make.—Of very thin cedar, pine, or other soft wood make a box 5 or 6 inches deep, 7 or 8 inches wide, and of a length just equal to the width of the window in which it is to be placed. Across the top, near each end, glue a strip of wood half an inch high and a quarter of an inch thick, for bridges. Into the ends of the box insert wooden pins, like those of a violin, to wind the strings around, two pins in each end. Make a sound-hole in the middle of the top, and string the box with small catgut, or blue first-fiddle strings. Fastening one end of each string to a metallic pin in one end of the box, and carrying it over the bridges, wind it around the turning-pin in the opposite end of the box. The ends of the box should be increased in thickness where the wooden pins enter, by a piece of wood glued upon the inside. Tune the strings in unison and place the box in the window. It is better to have four strings, as described, but a harp with a single string produces an exceedingly sweet melody of notes, which vary with the force of the wind.

HANGING BASKET, Novel.—Procure a large-sized turnip and scrape out the inside, leaving a pretty thick wall all around; fill the cavity with earth, and plant in it some clinging vine or morning-glory. Suspend the turnip with cords, and in a little time the vines will twine around the strings, and the turnip sprouting from below will put forth leaves and stems that will turn upwards and curl gracefully around the base.

HONEY (Artificial), To Make.—1. Take 5 pounds good common sugar, 2 pounds of water, gradually bring to a boil, skimming well; when cool add 1 pound bees' honey and 4 drops of peppermint. If you desire a better article use white sugar and $\frac{1}{2}$ pound less water, and one-half pound more honey.—2. Good brown sugar 10 lbs.; water 1 qt.; old bee bread honey in the comb 2 lbs.; cream of tartar 1 tea-spoon; gum arabic 1 oz.; oil of peppermint 3 drops; oil of rose 2 drops. Mix and boil 2 or 3 minutes and have ready 1 qt. more of water in which an egg is put well beat up; pour it in, and as it begins to boil, skim well, remove from the fire, and when a little cool, add 2 lbs. of nice bees' honey, and strain.—3. Coffee sugar 10 lbs.; water 3 lbs.; cream of tartar 2 oz.; strong vinegar 2 table-spoons; the white of 1 egg well beaten; bees'

honey $\frac{1}{2}$ lb.; Lubin's extract of honeysuckle 10 drops. First put the sugar and water into a suitable kettle and place upon the fire; and when luke-warm stir in the cream of tartar, and vinegar; then continue to add the egg; and when the sugar is nearly melted put in the honey and stir until it comes to a boil, take it off, let it stand a few minutes, then strain, adding the extract of honeysuckle last, let stand over night, and it is ready for use.—4. Take 10 pounds of Havana sugar, 4 pounds of water, 40 grains of cream tartar, 10 drops essence peppermint, and 3 pounds of honey; first, dissolve the sugar in the water over a slow fire, and take off the scum arising therefrom. Then dissolve the cream tartar in a little warm water, and add, with some stirring; then add the honey, heated to a boiling point; then add the essence of peppermint; stir for a few minutes, and let it stand until cold, when it will be ready for use.—5. Dissolve 20 lbs. of coarse sugar in 3 quarts of warm water; stir into it one-fifth of an ounce of cream of tartar dissolved in a little water, and also five or six pounds of good honey, and half a teaspoonful of essence of peppermint. Boil the whole slowly, twelve minutes, stirring constantly.

HONEY, Liquid.—Put two pounds of the purest white sugar in as much hot water as will dissolve it; take one pound of strained white clover honey—any honey of good flavor will answer—and add it warm to the syrup, thoroughly stirring together. As refined loaf sugar is a pure and inodorous sweet, one pound of honey will give its flavor to two pounds of sugar, and the compound will be free from that smarting taste that pure honey often has, and will usually agree with those who cannot eat the latter with impunity. Any desired flavor can be added to it.

HORN AND TORTOISE-SHELL, Manufacture of.—Almost the only kinds of horn that are the subject of manufacture are those of the bull and cow, and the hoofs of these animals; the horns of the bullock being thin, and of a very coarse texture, are used only for the most ordinary purposes. Our domestic supply is by no means equal to the demand, so that great quantities are imported from Russia, the Cape of Good Hope, and South America.

The first process is the separation of the true horn from the bony core on which it is formed; for this purpose the entire horns are macerated in water for a month or six weeks, according to the temperature; during this time, the membrane which lies between the core and the horn is destroyed by putrefaction, so that the core becomes loose and can easily be extracted. The cores are not thrown away, but are burnt to ashes, and in this state form the best material for those small tests or cupels employed by the assayers of gold and silver.

The next process is to cut off with a saw the tip of the horn—that is, the whole of its solid part—which is used by the cutlers for knife-handles, is turned into buttons, and applied to sundry other purposes. The remainder of the horn is left entire or is sawn across into lengths, according to the use to which it is destined. Next, it is immersed in boiling water for half an hour, by which it is softened; and, while hot, is held in the flame of a coal or wood fire, taking care to bring the inside as well as the outside of the horn, if from an old animal, in contact

with the blaze. It is kept here till it acquires the temperature of melting lead or thereabouts, and in consequence becomes very soft. In this state it is slit lengthwise by a strong pointed knife, like a pruning-knife, and by means of two pairs of pincers, applied one to each edge of the slit, the cylinder is opened nearly flat. These flats are now placed on their edges between alternate plates of iron, half an inch thick and eight inches square, previously heated and greased, in a strong horizontal iron trough, and powerfully compressed by means of wedges driven in at the ends.

The plates thus obtained are laid one by one on a board covered with bull's hide, are fastened down by a wedge, and are then scraped with a draw-knife having a wire edge turned by means of a steel rubber; when reduced to a proper thickness and smoothed, they are polished by a woolen rag dipped in charcoal dust, adding a little water from time to time, then rubbed with rotten-stone, and finished with horn shavings. The longest and thinnest of the films cut off by the draw-knife, when dyed and cut into various figures, are sold under the name of sensitive Chinese leaves, (being originally brought from China,) which, after exposure to a damp air, will curl up as if they were alive when laid on a warm hand or before the fire.

For combs, the plates of horn should be pressed as little as possible, otherwise the teeth of the comb will split at the points. They are shaped chiefly by means of rasps and scrapers of various forms, after having been roughed out by a hatchet or saw; the teeth are cut by a double saw fixed in a back, the two blades being set to different depths, so that the first cuts the tooth only half way down, and is followed by the other which cuts to the full depth; the teeth are then finished and pointed by triangular rasps. If a comb or other article is too large to be made out of one plate of horn, two or more may be joined together by the dexterous application of a degree of heat sufficient to melt but not to decompose the horn, assisted by a due degree of pressure; and when well managed, the place of juncture can not be perceived. The Chinese are remarkably skillful in this kind of work.

If a work in horn, such as one of the large combs worn by women, is required to be of a curved or wavy figure, it is finished flat, and is then put into boiling water till it becomes soft, and is immediately transferred to a die of hard wood, in which it is cautiously pressed, and remains there till cold.

Horn combs ornamented with open-work are not made in this country, because the expense of cutting them would be more than the price of the article would repay; but great numbers of them are imported from France. These, however, are not cut, but pressed in steel dies made in London for the French manufacturers; and from an examination of these combs, it is evident that the material must have been in a soft state, approaching to fusion, when put into the die.

Horn steeped for a week in liquor, the active ingredient of which is caustic fixed alkali, becomes so soft that it may easily be molded into any required shape; and shavings subjected to the same process become semi-gelatinous, and may be pressed in a mold into the form of snuff-boxes and other articles. Horn, however, so treated, becomes hard and very brittle, probably

in consequence of its laminated texture being obliterated by the joint action of the alkali and strong pressure.

Drinking-cups of horn are thus made: The horn being sawn to the required length, is scalded and roasted over the fire, as already described; but instead of being slit and opened, is placed while hot in a conical mold of wood; a corresponding plug of wood is then driven hard in, to bring the horn to shape. Here it remains till cold, and is then taken out and fixed by the large end on the mandrel of a lathe, where it is turned and polished both inside and outside, and a groove, or chine, as the coopers call it, is cut by a gauge tool within the small end for receiving the bottom. The horn is then taken off the lathe and laid before the fire, where it expands and becomes somewhat flexible; a round, flat piece of horn, of the proper size, (cut out of a plate by means of a kind of crown saw,) is dropped in and forced down till it reaches the chine, and becomes perfectly fixed in this situation, and water-tight by the subsequent contraction of the horn as it cools.

Horn is easily dyed by boiling it in infusions of various coloring ingredients, as we see in the horn lanterns, made in China. In Europe it is chiefly colored of a rich red-brown, to imitate tortoise-shell, for combs and inlaid work. The usual mode of effecting this is to mix together pearlsh, quicklime, and litharge, with a sufficient quantity of water and a little pounded dragon's blood, and boil them together for half an hour. The compound is then to be applied hot on the parts that are required to be colored, and is to remain on the surface till the color has struck; on those parts where a deeper tinge is required, the composition is to be applied a second time.

The Chinese also make bows partly of wood and partly of buffalo's horn; but the best Indian bows, those, namely, of Lahore, are made of horn combined with wood, and strapped round with sinew.

Horn was also used as we now employ glass in windows, for which, however, it is not very well adapted, as plates thin enough to be transparent would soon warp, and be corroded by exposure to the weather.

Horns are also of very ancient use as musical instruments; the true bugle-horn was made of the horns of the urus, or wild bull, tipped with silver, and slung in a chain of the same material.

Another use to which horn has been applied is as a material for defense, complete suits of armor having been made from it.

The general mode of manufacturing tortoise-shell is the same as already described when treating of horn. It is softened by boiling in water, but mere water takes away much of the color; an addition of common salt prevents this injury; but if too strong a brine is used, the shell will be very brittle. Two or more pieces of tortoise-shell may be joined by laying their scraped or thin edges together, and then pressing them between hot irons. If, however, the heat is too great, the colors are much deepened, so as to become almost black, as in the case with molded snuff boxes; for tortoise-shell, being less fusible than horn, can not be made soft enough to be molded without some injury to the color. Accordingly the manufacturers never

attempt to produce tortoise-shell combs with ornamental open-work by means of dies, but in the following manner:

A paper being pasted over the tortoise-shell, the pattern is drawn on the paper, and is then cut out by means of drills and fine saws; the paper is then removed by steeping in water, and the surface of the pattern is finished by the graver.

In making small side combs, it is found worth while, in order to save a costly material, to employ a machine consisting of a cutter working straight up and down, and of a bed (on which the shell is laid) to which is given a motion advancing by alternate inclination, first to one side and then to the other. By this means the teeth of the two combs are cut at the same time, those of the one occupying the intervals of the other. Such combs are called parted, the saw not being used upon them, and are often made of fine stained horn instead of tortoise-shell. Tortoise-shell is also used for inlaying tables, cabinets, and other ornamental articles, a metallic foil being placed below it to give lustre and color.

For modern uses, thick tortoise-shell is more valuable in proportion than thin; but among the Romans, where it was used only for inlaying, veneers were cut out of it.

HORN, To Color Black.—A process recently announced for imparting a black color to horn, without the aid of heat, consists in taking the articles, finished and ready for polish, and immersing them in a lye of caustic potash or soda, until the outer surface of the horn is somewhat dissolved, as shown by a greasy feel. With care, fine tooth combs can be treated in this way without any injury. They are then washed off and dipped in aniline black, slowly dried, and then again washed off. By transmitted light the horn is of a dark brown color, but by reflected light it is of a deep black.

HORN, in Imitation of Tortoise-Shell.—First steam and then press the horn into proper shapes, and afterwards lay the following mixture on with a small brush, in imitation of the mottle of tortoise-shell: Take equal parts of quicklime and litharge, and mix with strong soap-lees; let this remain until it is thoroughly dry; brush off, and repeat two or three times if necessary. Such parts as are required to be of a reddish-brown should be covered with a mixture of whitening and the stain.

HORSE, To Break of Pawing.—Nail iron strips across the horse's stall—say strips one inch wide and one-half inch thick, six inches apart, securely nailed crossways his stall—and they will soon make him sick of pawing, when he will no doubt find some other way of passing away the time. If he takes to kicking, fasten the trace chain around his fetlock; if to cribbing, trade him off and let some one else cure him of that detestable habit.

HORSE-COLLARS, and SADDLES, etc., Wooden.—Galled shoulders and backs are to no small extent due to the soft pads and cushions which are pressed upon the tender skin under which the muscles play, and upon which great weight or draught is borne. The skin thickens and gets tough to some extent, but the softer or more padded the collar or saddle, the more liable is the skin to blister and gall. This is because the perspiration is retained, the skin softened

and made to rub and move more upon the flesh and bone beneath. Horses whose backs galled under padded saddles would get well when used with well-fitting army-saddles, which were simply hard wooden trees covered with rawhide, dry and hard, almost like iron. Why the hint has not been before taken we cannot imagine, but only recently have we seen wooden horse-collars introduced. They have been used for some time at the South—more, we fancy, from necessity than from choice, but with the best results. Now, two companies are manufacturing them in this city, and other hard materials not liable to absorb water are being introduced. Some are made to be used with hames; others have hooks or other attachment places for traces upon the collar itself. One patented material called "Flaxhorn" is very tough, capable of being worked into very light strong collars, saddletrees, harness, saddles, and pads.

A wooden collar for ordinary work can be made which opens like ordinary hames, at the top, but the two parts are fastened together at the bottom by a strong iron hinge. Others open to go over the head of the horse at two points a little below the trace-hooks on each side; others still chiefly in use for mules, we believe, do not open at all, but are made in one piece, with two spots cut out on each side, so that the collar will go over the head, and not hurt the bony projections over the eyes. As we see it, there is a great future for hard horse-collars, etc., and we fully believe they will be not only lighter, but far easier for horses than the heavy costly padded things they are now tortured with.

HOUSES, To Keep Cool in Hot Weather.—In very hot days a cool apartment is a real luxury to be had far oftener than most people suppose possible. The secret consists, not in letting in cool air, for naturally all do that whenever they have the chance; but in keeping out the hot air. If the air outside a room or house be cooler than the air inside, let it in by all means; but if it be hotter, carefully keep it out.

A stair-case window left open during the night will often cool the passages of a house, and the rooms, too, if their doors be not shut; but it must be closed at 8 or 9 o'clock in the morning, or, if on the sunny side, at 4 or 5 o'clock, and the blind drawn down. The mistake people generally make is to throw open their windows at all hours of the day, no matter whether the atmosphere outside be cool or scorching.

Let us have some air, they say, and in comes the treacherous breeze—for even hot air is pleasant while it is gently blowing, taking away perspiration, and thereby cooling the skin; but the apartment is made warmer, instead of cooler, and as soon as they move out of the draught they find their room to be more uncomfortable than before.

Let in cool air—keep out hot—that is the only formula to insure the minimum of discomfort. Sitting-rooms may generally be kept cool during the whole day if the doors be only opened for ingress and egress, and the windows kept closed and shielded from direct sunshine by a blind. If the atmosphere of a room be impure from any cause, let it be renewed; hot air is less injurious than bad air. If a room be small in comparison with the number of persons engaged in it, free ventilation becomes indispensable.

In a cooking apartment the temperature will probably be higher than outside, hence the free admission even of hot air will be desirable. If persons do not object to sit in a direct draught of air, windows and doors may be opened, a breeze being more refreshing, even though several degrees warmer than still air; but under nearly all other circumstances rooms should be kept closed as much as possible until after sundown, or till the air outside is cooler than that inside. Let in cool air; keep out hot.

ICE CHEST, To Make.—Take two dry goods boxes, one of which is enough smaller than the other to leave a space of about three inches all around when it is placed inside. Fill the space between the two with sawdust packed closely, and cover with heavy lid made to fit neatly inside the larger box. Insert a small pipe in the bottom of the chest to carry off the water from the melting ice. For family use this has proved quite as serviceable and as economical as more costly "refrigerators."

ICE, To Gather.—Ice should be cut early, as the first ice keeps best, and is easier procured. Snow has to be removed from the surface of the ice before cutting, and it also injures the quality. It should be gathered in December; select a clear, cold day, and, with ice tools—which should consist of a cross cut saw, an axe, a pike pole, and an ice ladder—go to the scene of your operations. Cut three feet wide with the saw, and split off with the axe, by chipping out a V, or wedge-shaped hole, at each edge; then strike a few light blows in each hole until the block separates from the mass. In this manner you can get your blocks out nearly as true as with the saw.

A convenient size to handle and pack is about two by three feet. Twelve cakes will pack one layer eight by nine feet square, which laid up eight or nine feet high, is sufficient to last a large family.

The ice ladder is used to draw the floating cakes of ice upon the surface, and to load them upon the sled or stone-boat, for removal to the ice-house. The ladder is about twelve feet long and twenty inches wide. The upright pins must be strong, and the round at one end extend through both sides, to make handles. The ladder is lowered into the water, and the cake of ice floated over it. Then draw out the ladder, and at the same time lower the handles. The pins will hold the cakes upon the ladder; when upon the surface, it can be quickly unloaded, by raising one side of the ladder. The ice should be taken to the house, and packed at once. Use a plank to move the cakes, where needed, when packing.

Look to your drainage; also see that your house is tight at the bottom; for a current of air passing through the ice, causes it to melt rapidly. Leave a space of six inches between the ice and walls, and fill in with straw, packed close, or sawdust, tanbark or swamp moss. The latter is to be preferred. Cover with a thick layer, and fill to the roof with straw. Use double doors, with a cooling room.

ICE-HOUSE, To Build.—A family ice-house need not be an expensive structure. It may be built cheaply, subserve its object excellently, and add to the attractions of a homestead by being a sightly object. A building of twelve feet square and eight or nine feet high, is sufficient

for the wants of the most exacting family. It may be a frame building, entirely above the surface of the ground, and better if supported on posts elevated a few inches, to be certain of good drainage. Built of joists two by three inches, with an outer boarding, having inside another series of uprights, also boarded, from six to ten inches removed from the outer shell, with a solid floor of plank, the space between the two walls filled with tan, sawdust, straw, or chaff, and a roof of good pitch, the ice-house is complete. A drain for water should be made from the floor, and the pitch of the roof filled with straw, hay, or some similar dry, porous material. On the roof should be a ventilator, the top defended from the rain or snow. The ice should be packed in one solid mass, the sides not reaching the inner walls of the building, but allowing a space of from six to twelve inches all around. The top of the ice should be covered with straw and the doors should be like the sides of the building, or double doors should be made, one in the outer and the other in the inner wall. Plant morning glories or any climbing plant around the building and induce them to creep up the walls and over the roof as an additional defense against the fervid sun of summer. Two workmen, if not practical carpenters, can put up such a building in one, or at most, two days, which if taste and judgment is used, will prove to be a sightly addition to the attractions of a country home, and a useful adjunct to the farm, its contents being invaluable in sickness. Such an ice-house would prove also convenient as a refrigerator on a large scale, preserving food of various kinds and the products of a dairy.

It costs but little to build an ice-house, that will keep ice the year round, where practical utility only is aimed at, and not elegance of structure. A writer on this subject says: Last January I drew one large load of sawdust and spread on the ground on the north side of my horse barn, then drew the ice (sawed in square cakes) and built up a square pile some eight by ten feet and seven or eight feet high, filling up the spaces between the cakes with pounded ice. I then set up scantling and built a board house around it two feet larger each way than the ice; then filled in sawdust around and two to three feet on top, and covered with boards and slabs. We have used freely through the season, sold to pic-nic parties, given away to sick neighbors, and have plenty of ice yet.

Another writer thus tells how he constructed an ice-house: I set posts in the ground, so as to make a house twelve feet square, (three posts on each side,) then board or plank it up eight feet high, on the inside. The surface earth is now dug out six inches deep, and sawdust filled in one foot deep, making it six inches above the level of the earth. The ice is carefully packed, nine feet square and six feet high, leaving a space of eighteen inches between ice and boards, closely packed with sawdust, and the same thickness of sawdust placed on top. I have an old-fashioned board roof over this ice-house. The space above the sawdust is left open, so that the air can circulate through, and the sun shine in. The result is that we have used ice daily and have a plenty yet. As to the cost, four men with one team, cut, hauled and packed the ice, and filled in the sawdust in less than two days, notwithstanding we had to haul the ice $\frac{1}{2}$ mile.

INDIA RUBBER, Artificial.—Prof. Sonnenschein has discovered that an elastic mass resembling caoutchouc may be obtained by combining tungstate of soda with certain organic substances. If tungstic acid or tungstate of soda be added to glue, and afterward muriatic acid, a compound of tungstic acid glue is precipitated which is so elastic at 85–105° F., that it can be drawn out into very thin fibres. On cooling, the mass becomes very solid and brittle. It is proposed to employ this substance in place of the costly albumen for mordanting cotton, especially for aniline colors. The same material has been used in tanning leather; but this became hard as stone, and consequently unsuitable for ordinary purposes. By adding tungstate of soda and muriatic acid to a solution of gelatine, and heating the precipitate, a substance is obtained which may be used as a putty or cement in many cases.

INK, Black.—The fault with most black ink is too much iron, turning the writing brown from oxidation. To remedy this, acid (generally vinegar or an acid salt, as alum) is added, which corrodes the pens. The iron should only be in sufficient quantity to strike a black color. The following will be found a convenient and excellent formula:—Boil 1 part of granular powdered galls with 20 parts of distilled water in a glass flask for fifteen or twenty minutes; then add 1 part sulphate of iron, dissolved in 2 parts of distilled water, and 1 part of mucilage of acacia; shake all together. It is ready for immediate use, but improves by keeping. It is better not strained, but poured off as wanted. A few drops of carbolic acid may be added to preserve it, if required to be kept long.

INK (Copying), that does not Require Dampening.—Use the same ingredients as for ordinary copying ink, except that the quantity of water used be decreased by from twenty to thirty per cent., and the same quantity of glycerine be added. This ink will, when written on, set off upon any dry sheet of paper by simply rubbing it.

INK, Solid.—Set 250 grammes of powdered nutgalls in half a litre of alcohol of eighty-two degrees, and warm by gentle heat for twenty-four hours; then mix ninety-eight gr. of sulphate of iron in a litre and a half of pure water; strain the two liquids through a cloth separately, then mix them, let them stand for eight days, and strain them again. This ink leaves no deposit, nor does it get mouldy, and is more solid than any employed.

INK (India), To Remove the Mark of on the Flesh.—Blister the part with a plaster a little larger than the mark; then keep the place open with an ointment for a week; finally, dress it to get well. As the new skin grows, the tattoo will disappear.

INK, Indelible Printing.—This is made by mixing 1 pound varnish (such as is used for ordinary printing ink), 1 pound black sulphuret of mercury, 1 ounce nitrate of silver, 1 ounce sulphate of iron, 2 tablespoonfuls lampblack. Thoroughly grind together, adding enough turpentine to reduce to the requisite consistency.

INTEREST, New Rule for Computing.—This rule is so simple and so correct, that every banker, merchant or clerk should post it up for reference:

Six per Cent.—Multiply any given number of

dollars by the number of days of interest desired, separate the right hand figure and divide by six; the result is the true interest on such number of days at six per cent.

Eight per Cent.—Multiply any given amount by the number of days upon which it is desired to ascertain the interest, and divide by 45, and the result will be the true interest for the time required.

Ten per Cent.—Multiply the same as above, and divide by 36, and the result will show the interest at ten per cent.

IRON and COPPER, Delicate Test for.—The alcoholic tincture of logwood will produce a blue or bluish-black tint in water which has been run through iron or copper pipes, when neither tincture of galls, sulphocyanide, nor the ferrid and ferrocyanides of potassium show any reaction.

ISINGLASS GLUE, To Make.—This is made by dissolving beaten isinglass in water by boiling, and having strained it through a coarse linen cloth, evaporating it again to such a consistency, that, being cold, the glue will be perfectly hard and dry.

A great improvement is made in this glue by adding spirit of wine or brandy after it is strained, and then renewing the evaporation till it gains the due consistency.

IVORY, Artificial.—The inventor, Mr. Marquardt, dissolves two pounds of pure rubber in thirty-two pounds of chloroform, and hereupon saturates the solution with a current of ammonia gas. When the rubber has been completely bleached, the admission of the gas is interrupted, and the mass is transferred into a vessel, provided with a stirrer, in which it is washed with hot water until the bleaching agent has been entirely removed. During this operation, the temperature may be increased to 185° Fahr., in order to evaporate the chloroform, which, by conducting it into an apparatus of condensation, may again be made use of. The remaining product forms a kind of froth, which, being pressed out, dried, and again treated with a small quantity of chloroform, is finally obtained as a consistent paste. The paste is now mixed with a sufficient quantity of finely pulverized phosphate of lime, or carbonate of zinc, until it assumes the appearance of moist flour. In this condition it is pressed in hot moulds, which it leaves sufficiently hard to be turned, planed, filed, and bored. In order to imitate corals, pearls, enamels, hard woods, etc., it is only necessary to mix the paste with the desired colors previously to its being compressed.

IVORY, To Bleach.—A new process for bleaching ivory when it has assumed a dirty yellow color, consists in first soaking the pieces for two days in a solution of one-half pound carbonate of soda and two pounds of water; then, after rinsing in cold water, transferring the pieces to a solution of three-quarters of a pound sulphate of soda in two pounds of water, and leaving them for five or six hours. While soaking in this solution, one ounce of hydrochloric acid in four ounces of water is added and thoroughly mixed, the pieces usually, two days after, resuming their whiteness; repetition of the process being sometimes, however, necessary.

IVORY, Dyes for.—**Black.**—Immerse the ivory in a boiling solution of logwood, take it out and wash it in a solution of copperas. —**Blue.**—Immerse the ivory in a mixture of sulphate of

indigo and water, partly neutralized with potash. —*Green*.—Steep blued ivory in a solution of nitromuriate of tin, and then in a decoction of fustic; or it may be at once dyed green by steeping it in a solution of acetate of copper. —*Yellow*.

—Steep the ivory in a bath of neutral chromate of potash, and afterwards in a boiling solution of acetate of lead. —*Red*.—Steep the ivory for a short time in a solution of tin, then in a decoction of Brazil or cochineal. —*Violet*.—Moisten the ivory with a solution of tin, as before, then immerse it in a decoction of logwood.

IVORY, BONE and HORN, To Impart a Beautiful Red Color to.—Take four parts of picric acid and dissolve in two hundred and fifty parts of boiling water; when cold add eight parts of liq. ammonia. Dissolve also two parts of magenta (crystals) in forty-five parts of alcohol, dilute with three hundred and seventy-five parts of hot water, and add fifty parts of ammonia. As soon as the red color of the magenta solution has disappeared, the two solutions are mixed together, making a bulk of liquid amounting to about half a litre. Ivory and bone should be placed in very weak nitric or hydrochloric acid first, before being immersed in the ammoniacal liquid; wood cannot be dyed in this liquid unless it has been previously painted over with paste made from flour. If to the ammoniacal liquid some gelatine solution is added, it may serve as a red ink which does not attack steel pens. By varying the proportions of the magenta and picric acid, the tints obtained may be varied from a bluish red to a bright orange red. The desired colors do not appear till the ammonia is evaporated.

IVORY, To Soften.—In three ounces of spirits of nitre, and 15 of spring-water, mixed together, put your ivory in a soaking. And in 3 or 4 days it will be soft so as to obey your fingers.

IVORY, To Silver.—Immerse a small slip of ivory in a weak solution of nitrate of silver, and let it remain till the solution has given it a deep yellow color; then take it out and immerse it in a tumbler of clear water, and expose it in the water to the rays of the sun. In about 3 hours the ivory acquires a black color; but the black surface on being rubbed soon becomes changed to a brilliant silver.

IVORY, Transparent.—The process for making ivory transparent and flexible is simply immersion in liquid phosphoric acid, and the change which it undergoes is owing to a partial neutralization of the basic phosphate of lime, of which it principally consists. The ivory is cut in pieces not thicker than the twentieth part of an inch, and placed in phosphoric acid of a specific gravity of 1.131, until it has become transparent, when it is taken from the bath, washed in water, and dried with a clean linen cloth. It becomes dry in the air without the application of heat, and softens again under warm water.

IVORY, To Whiten.—Slake some lime in water; put your ivory in that water, after being decanted from the grounds, and boil it till it looks quite white. To polish it afterwards, set it in the turner's wheel; and, after having worked, take rushes and pumice-stones, subtile powder, with water, and rub it till it looks perfectly smooth. Next to that, heat it by turning it against a piece of linen or sheepskin leather; and, when hot, rub it over with a little whitening diluted in oil of olive; then, with a little dry

whitening alone; finally with a piece of soft white rag. When all this is performed as directed, the ivory will look very white.

Dr. Artus has recently published a process for whitening ivory, which he specially recommends for the finger pieces of pianos; but it is also applicable to all articles made of this material, which is so apt to change its color. After lying some days in a solution of carbonate of soda, the pieces must be thoroughly washed in clear water and again placed in a bath composed of three-quarters of a pound of sulphite of soda dissolved in two gallons of water, in which they must remain five or six hours. Then, without taking them from the bath, a mixture of one ounce of chlorhydric acid and four ounces of water must be added to it. In this, after shaking it well and recovering the vessel, they must remain thirty-six hours. The solution is then thrown off and the ivory washed as before in clean water. If not as white as desired the operation must be repeated. The quantity of the solution that has been indicated is sufficient to whiten a pound of ivory.

JET, To Clean.—Use the softest brush that can be procured, to remove the dust in the most gentle manner from the carving, and then touch the jet with a little good oil on a bit of cotton wool, and polish with wash-leather. The process requires the greatest care, as the carving makes the jet so brittle.

KITE, How to Make.—Among the various kinds the "three-stick kite" is probably the surest for the beginner. Get three light, thin, straight sticks, of cedar, pine, or similar wood; smooth them, and let them be about half an inch wide by an eighth thick; perhaps a little more. Make two of them 30 inches long, and the third 20 inches. Mark a point 10 inches from the end of each of the long sticks, and in the middle of the short one; cross the three sticks at these points, and tie them firmly with twine. Cut notches lengthwise across the ends of the sticks, and tie a strong twine from end to end, making the outline of an irregular six-sided figure, of which the bottom may be 16 inches long; the sides about 18½; the shoulders 11, and the top 8 inches. These numbers may vary; it is necessary only that the corresponding sides should be exactly alike or the kite will not be well balanced. This finishes the frame.

Now lay down a sheet of strong, light paper, place the frame upon it, and cut the paper about two inches larger than the frame, all round. Fold the outside over the strings, and paste down with good boiled flour paste, cutting out the corners where they overlap.

The next thing is to hang the kite. Measure from each lower corner five inches along the sticks; make a small hole on each side of the stick through the paper, and tie in the ends of a string, which shall measure, when tied, about 14 inches from stick to stick. This is the lower loop. In like manner tie an upper loop, about 8 inches long, to points about 3 inches from the upper end of the same stick. Remember to have the loops on the face side of the kite; that is, the side on which the sticks are not seen. Join the middles of the two loops by a string about 20 inches long; this is the belly-band. Hang the kite by the belly-band over your finger, and hold it so that when one end of the kite touches the floor, the other may be about a foot above

it; there is the place to tie the line, making it fast so that it will not slip. When the kite floats in the air, it should lie at an angle of about 45 degrees; if it stands too straight, the string is fastened too low on the belly-band; if too flat, the string is not low enough.

The kite must have a tail to balance it. If the tail is too heavy, the kite will not raise it; if too light, or if too short, the kite will not "stand" steadily, but will dive from side to side. Whenever it does that, it should be taken in, and more weight added to the tail. Cut pieces of writing paper, 4 inches wide and 6 or 8 long; fold back and forth fan-like, and tie 3 inches apart on a string, until you have made 3 or 4 yards. Then cut a quantity of strips half an inch wide, and 12 or 14 inches long; tie the bunch of them by the middle, fold the ends together and tie again, making a tassel, which you may tie to the end of the tail. If the strips are of colored tissue paper, all the gayer. Tie a string about twenty inches long to the two lower corners of the kite, and fasten the tail to the middle of it. Choose a smooth, close, well spun string, linen is best—and costs most—not too large, or its weight will make it "sag," nor too small, or the kite will fly away with it. Finally, don't try to fly a kite when the wind don't blow.

Now, just as each of your good mothers thinks she has a recipe for making cookies which she thinks is a little better than any other, so every boy who has experience in kite-making thinks his way is rather the best, and quite likely he may find fault with some of our proportions. If so, he has perfect liberty to change them to his liking. The important items are: the kite must be truly made, so that one side may just balance the other; it must hang at the proper angle to the wind; and the tail must be rightly proportioned in weight and length to the size of the kite.

If the kite don't behave well at first, think which of these items has not been carefully attended to, and correct. Don't give up at the first trial.

LAMPWICKS, Home-Made.—A lamp wick, equally good with those we buy, may be made out of canton flannel. Take a strip three times as wide as you wish the wick to be, and as long as you like. Fold it with the fleecy side in, so that it will have three thicknesses, and baste or overcast it up the side. Almost every house-keeper has bits of canton flannel which would be used for nothing else, and it saves quite a little item of expense, to say nothing of the convenience of being able to make a new lamp wick, whenever it is needed.

LAND, To Drain.—A strong metal pipe, about 20 feet in length and 6 inches in diameter, is adjusted in a slanting position over the lot to be drained. To an opening in the bottom of this pipe, another is firmly jointed, inclining backwards at an angle sufficient to allow of its end resting on the ground lot. Connected with the principal pipe, is a strong canvas hose, down which a current of water descends, and issues at the mouth of the pipe. In its course, it forms a vacuum in the second pipe, and the water is thus sucked up and discharged with the current flowing through the principal pipe. This device is in use, for the purpose described, in Australia, but is known to most men practically acquainted with hydraulics.

LEAD (White), To Test.—Take a pine splinter, put some of the lead on the end of it, set it on fire; if pure, you will see the small shots of lead drop from it; if a white incrustation, you may know it is not pure. Rub this on a clean white paper; if any lead is present it will black the paper; if no lead is present it will be a pale, sulphur color.

LEAVES (Autumn), To Preserve.—The beautiful colors of the leaves at this season are indicative of the first stage of decay. If rapidly dried, the process may be arrested and the fine colors preserved. Dry as quickly as possible, by putting the leaves between folds of any very absorbent paper, and change frequently—as often as once a day. A warm flat-iron judiciously used will help the drying, but overheating will spoil all. When the leaves are quickly and thoroughly dried, they will retain their colors for some months. In making up ornamental work, the leaves should have a light coat of boiled linseed oil. This brings out the color and gives a more natural appearance than varnish of any kind. For fastening them to card-board or any other support, glue is best. Do not oil the under sides of the leaves, as this will prevent the glue from adhering.

LEATHER, Bronzing for.—A small amount of so-called insoluble (in water) aniline violet is dissolved in a little water, and the solution is brushed over the articles; it will dry quickly, and perhaps may have to be repeated.

LEATHER, To Gild.—In order to impress gilt figures, letters, and other marks upon leather, as on the covers of books, edgings for doors, etc., the leather must first be dusted over with very finely powdered yellow resin or mastic gum. The iron tools or stamps are now arranged on a rack before a clear fire, so as to be well heated, without becoming red hot. If the tools are letters, they have an alphabetical arrangement on the rack. Each letter or stamp must be tried, as to its heat, by imprinting its mark on the raw side of a piece of waste leather. A little practice will enable the workman to judge of the heat. The tool is now to be pressed downwards on the gold-leaf, which will of course be indented, and show the figure imprinted on it. The next letter or stamp is now to be taken and stamped in like manner, and so on with the others, taking care to keep the letters in an even line with each other, like those in a book. By this operation the resin is melted, consequently the gold adheres to the leather. The superfluous gold may then be rubbed off by a cloth, the gilded impressions remaining on the leather. In this, as in every other operation, adroitness is acquired by practice.

The cloth alluded to should be slightly greasy, to retain the gold wiped off (otherwise there will be great waste in a few months); the cloth will thus be soon completely saturated or loaded with the gold. When this is the case, these cloths are generally sold to the refiners, who burn them and recover the gold. Some of these afford so much gold by burning as to be worth from seven to ten dollars.

LEATHER (PATENT) GOODS, Polish for.—Take half a pound of molasses or sugar, one ounce of gum-arabic, and two pounds of ivory black; boil them well together, then let the vessel stand until quite cooled, and the contents are settled; after which bottle off. This is an excellent reviver, and may be used as a blacking in

the ordinary way, no brushes for polishing being required.

LIGHTS, Bengal.—Take of nitrate of potassa (saltpetre), 8 parts; sublimed sulphur 4 parts, and antimony 1 part, and let them be well mixed in powder and beat firmly into a stout iron cup, and set on fire; and if a little camphor be added it is still more brilliant. Such lights are made use of for communicating at a great distance by sea at night.

LIGHT PHIAL.—Dry phosphorus, 1 part; olive oil, 6 parts. Put them into a phial, cork it, and place it in warm water for two or three hours. For use, pull out the cork, and sufficient light will be emitted to enable you to see the time by a watch. One bottle will last for years if well corked as soon as used. Ether may be employed instead of olive oil.

LOGS and PLANKS, To Prevent the Splitting of.—Logs and planks split at the ends because the exposed surface dries faster than the inside. Saturate muriatic acid with lime, and apply like whitewash to the ends. The chloride of calcium formed attracts moisture from the air, and prevents the splitting.

LOVAGE.—Lovage root (fresh), 1 pound; valerian, $\frac{1}{4}$ pound; celery, $\frac{1}{4}$ pound; sweet fennel, $\frac{1}{4}$ pound; caraway seeds, 1 ounce; cassia, 1 ounce; proof-spirit, 12 gallons. Macerate for a week, then add loaf-sugar, 20 pounds, dissolved in water, 10 gallons. Mix and fine.

LUMBER, Facts about.—That drying lumber does not season it, and seasoning lumber is not drying it. That any amount of common air drying does not necessarily (if ever) produce a thorough shrinkage, even though the time be a hundred years. That time has nothing to do with either seasoning, shrinking or drying, but is alone the result of condition and heat. That lumber may be thoroughly seasoned without being either dried or shrunk.

That lumber may be made as dry as desired, and yet not be seasoned at all, and with only a partial or very slight shrinkage. That common air never seasons lumber (though it dries it), and can never more than partially shrink the wood. That seasoning, shrinking and drying are each separate and distinct operations, and in most cases do not depend at all upon each other. That they are all necessary, though not in the same degree. That the order of their value to the wood is in the order named; the seasoning being of the greatest, and the drying of the least value.

MAGIC COPYING PAPER.—To make black paper, lampblack mixed with cold lard; Red paper, Venetian Red mixed with lard; Green paper, Chrome Green mixed with lard; Blue paper, Prussian Blue mixed with lard. The above ingredients to be mixed to the consistency of thick paste, and to be applied to the paper with a rag. Then take a flannel rag and rub till all color ceases coming off. Cut your sheets four inches wide, and six inches long, put four sheets together, one of each color, and sell for twenty-five cents per package. The first cost will not be over three cents. Directions for writing:—Lay down your paper upon which you wish to write; then lay on the copying paper, and over this lay any scrap of paper you choose; then take any hard pointed substance and write as you would with pen.

MANUSCRIPT, Preparation of.—1. See

that the manuscript is perfect before it is placed in the hands of the compositor. Time is charged on all corrections, alterations, and additions made in the proof, which are not in the original copy. A very little change takes up more time than is generally supposed. The insertion or removal of a word or two may require the over-running of every line in a long paragraph; the adding or taking out of a sentence, the over-running of every page set up, which follows it. All this can be avoided by having the manuscript carefully prepared.

2. It is desirable that the manuscript should be written in a plain distinct hand, in order to insure correctness and avoid delay. The time work charged on a badly-prepared manuscript will often exceed the cost of having it fairly copied by a clerk.

3. Write on one side of the paper only, and page the whole. Leave a wide margin, on which can be written directions for the compositor and minor corrections. Marginal corrections are preferable to interlineations. When they are too long to go in the margin, write them on a separate piece of paper, marking it with the page, and indicating on the page the place where it is to be inserted. Write on the margin the amount of space, if any, desired between paragraphs or divisions, for the insertion of additional authorities, etc.

4. Attend to your own punctuation, marking each point distinctly. Remember the old craft pun, that "compositors are setters, not pointers"—their duty is to "follow copy." The whole force of a paragraph may be destroyed by careless punctuation.

5. Write on a separate page exactly what you want on the cover, the number of copies wanted, and the style selected.

6. Make a final careful revision of the manuscript before handing it in.

7. Authors should always make the beginning of a new paragraph conspicuous to the compositor, by indenting the first line of it far enough to distinguish it from the preceding line in case it should be quite full.

8. When copy is put into the hands of the compositor he should receive directions respecting the width and length of the page; whether it is to be leaded, and with white lines between the breaks; and whether any particular method is to be followed in the punctuation and in the adoption of capitals.

MANUSCRIPT, Estimate of.—A tolerably close estimate of the words contained in even bad manuscript may be made by counting the lines of say twelve of its varying pages, then getting an average per line of the words in several lines taken from each page, and multiplying the number of the former by that of the latter. Next add the average allowance for chapter lines, sub-heads, and other than break lines, counting them as full lines. Reduce the break lines to full lines, adding them to the whole, and you have the contents of twelve pages. Divide by twelve to find the contents of a single (average) page.

Example.—A work of 400 pages in manuscript is submitted. Twelve averaged pages, taken at intervals, give an average of 30 lines to a folio. Three lines taken at various places from each of these twelve pages indicate an average of eleven words to a line. This will give about 330 words

to a page, exclusive of breaks, chapter, and other lines, for which an allowance is made of four lines, or 44 words, for each page of manuscript, which, added to 330, makes 374. Multiply the 374 words per page by the 400 pages in the manuscript, and you have a result of 149,600 words in all.

To know how many pages of printed matter this will make, it is now necessary to have the size of type and page to be used. An exact printed page, containing the one and representing the other, is always a good guide in completing the calculation, which is done by dividing the number of words contained in the manuscript, by that of the printed page. This will give the desired cast-off for the work in printed pages.

Thus, the estimate of the manuscript gives 149,600 words; that of the printed page, of the size required,—set up in leaded long-primer, we will say, for example,—gives 480 words; consequently 149,600 divided by 480 gives 312 pages, or 20 signatures, if printed in octavo.

When extra, or more than single, "leading" of matter is required, count the extra leads (six-to-pica being the size most used in book composition) in the following proportions: three for a nonpareil line; four for brevier and bourgeois; five for long-primer and small-pica; six for pica; and so on, increasing or diminishing in the necessary ratio for larger or lesser sizes.

For works under 144 pages, the cast-off of which does not reach a number of folios divisible by 4, there should be added the number that will make it so. Thus, 110 will be counted as 112; 133 as 136; and so on. A sufficient allowance of pages, added in the same way, should be made in cast-offs for larger works, adopting 8 or 12 as the even dividing number. This rule applies more particularly to works where the copy is very irregular or much crowded with abbreviations and closely written notes, alterations, interlines, etc.

MAP COLORS.—*Blue.* A weak mixture of sulphate of indigo and water, to which add a little gum.—*Green.* 1. Dissolve crystals of verdigris in water, and add a little gum.—2. Dissolve sap green in water and add gum.—*Red.* 1. Make a decoction of Brazil dust in vinegar, and add a little gum and alum.—2. Make an infusion of cochineal and add a little gum.—*Yellow.* 1. Dissolve gamboge in water.—2. Make a decoction of French berries, strain, and add a little gum arabic.

MAP VARNISHES.—A very good varnish for covering over architectural drawings, maps, etc., can be made by dissolving one pound of white shellac, a quarter of a pound of camphor and two ounces of Canada balsam in one gallon of alcohol.

The following method affords also a good, quick-drying varnish. Thin down Canada balsam with turpentine, and add one-fourth of the bulk of quick-drying, pale copal varnish; lay on smoothly with a flat camel's hair brush, and let the map lie flat for a few hours.

MARBLE AND GLASS, To Polish.—Marble of any kind, alabaster, and hard stone, or glass, may be repolished by rubbing it with a linen cloth dressed with oxide of tin (sold under the name of putty powder). For this purpose, a couple or more folds of linen should be fastened tight over a piece of wood, flat or otherwise, according to the form of the stone. To repolish

a mantelpiece, it should be first perfectly cleaned. This is best done by making a paste of lime, soda, and water, wetting well the marble, and applying the paste. Then let it remain for a day or so, keeping it moist during the interval. When this paste has been removed, the polishing may begin. Chips in the marble should be rubbed out first with emery and water. At every stage of polishing, the linen and putty powder must be kept constantly wet. Glass, such as jewelers' show counter-cases, which becomes scratched, may be polished in the same way.

MARBLE, To Clean.—1. Brush the dust off the piece to be cleaned, then apply with a brush a good coat of gum arabic, about the consistency of a thick office mucilage, expose it to the sun or dry wind, or both. In a short time it will crack and peel off. If all the gum should not peel off, wash it with clean water and a clean cloth. Of course, if the first application does not have the desired effect, it should be applied again.—2. Make a paste with soft soap and whiting. Wash the marble first with it, and then leave a coat of the paste upon it for two or three days. Afterwards wash off with warm (not hot) water and soap.—3. Chalk (in fine powder), 1 part; pumice, 1 part; common soda, 2 parts. Mix. Wash the spots with this powder, mixed with a little water, then clean the whole of the stone, and wash off with soap and water.

MARBLE (Artificial), for Paper Weights.—Soak plaster of Paris in a solution of alum; bake it in an oven, and then grind it to a powder. In using, mix it with water, and to produce the clouds and veins, stir in any dry color you wish; this will become very hard and is susceptible of a very high polish.

MARBLE, To Cut and Polish.—The marble saw is a thin plate of soft iron, continually supplied, during its sawing motion, with water and the sharpest sand. The sawing of moderate pieces is performed by hand; but that of large slabs is most economically done by a proper mill. The first substance used in the polishing process is the sharpest sand, which must be worked with till the surface becomes perfectly flat. Then a second, and even a third sand, of increasing fineness, is to be applied. The next substance is emery, of progressive degrees of fineness; after which, tripoli is employed; and the last polish is given with tin putty. The body with which the sand is rubbed upon the marble is usually a plate of iron; but, for the subsequent process, a plate of lead is used, with fine sand and emery. The polishing-rubbers are coarse linen cloths, or bagging, wedged tight into an iron planing-tool. In every step of the operation, a constant trickling supply of water is required.

MARBLE, Colors for Staining.—It is necessary to heat the marble hot, but not so hot as to injure it, the proper heat being that at which the colors nearly boil. *Blue*; alkaline indigo dye, or turnsole with alkali. *Red*; dragon's blood in spirits of wine. *Yellow*; gamboge in spirits of wine. *Cold Color*; sal-ammoniac, sulphate of zinc, and verdigris, equal parts. *Green*; sap green, in spirits of potash. *Brown*; tincture of logwood. *Crimson*; alkanet root in turpentine. Marble may be veined according to taste. To stain marble well is a difficult operation.

MATCHES, To Make.—1. Chlorate of potash and flowers of sulphur, each 10 parts; ver-

million, 2 parts. Oil of turpentine to mix. Dip the ends of the matches previously sulphured and steeped in turpentine into this paste and dry.—2. Chlorate of potash, 10 parts; sugar and sulphur, each 3 parts; wheat flour and vermilion, each 1 part. Spirit to mix. For use, dip them into the instantaneous light bottles.—3. Dip the end of the wood in hot melted sulphur and let it dry. To 4 parts of melted glue, add while hot 1 part of phosphorus and stir in whitening to the desired thickness, color with lampblack; dipping in this mixture, which is to be kept hot by being suspended over a fire or lamp.—4. About the best known preparation for friction matches consists of gum arabic, 16 parts by weight; phosphorus, 9 parts; nitre, 14 parts; peroxide of manganese, in powder, 16 parts. The gum is first made into a mucilage with water, then the manganese, then the phosphorus, and the whole is heated to about 130 deg. Fah. When the phosphorus is melted the nitre is added, and the whole is thoroughly stirred.

MATTING and OILCLOTH, To Brighten.—Wash it twice during the summer with salt and water, say about a pint of salt, dissolved in half a pailful of warm, soft water, drying the matting quickly with a soft cloth. The salt will prevent it from turning yellow. Another plan is, after the oilcloth is scrubbed and dried, to rub it all over with a cloth dipped in milk. This will bring the colors out very bright.

MEASURES, Table of.—A barrel contains 40 gallons, of 231 cubic inches each, or 9240 cubic inches.

The United States standard bushel is the Winchester; its regular dimensions are a cylinder of 18.5 inches, interior diameter, and 8 inches deep; its cubic contents are, therefore, $9.25 \times 9.25 \times 3.1416 \times 8$, or nearly 2150.5 cubic inches.

The United States standard gallon measures 231 cubic inches; consequently a box, 24 inches by 24 inches square, and 16 inches deep, will contain 9232 cubic inches, or nearly a barrel.

A box, $17\frac{3}{4}$ by 15 inches, and 8 inches deep, will contain 2130 cubic inches, or nearly a bushel.

A box, $14\frac{1}{2}$ by 10 inches, and $7\frac{1}{2}$ inches deep, will contain 1075 cubic inches, or half a bushel.

A box, 8 by 8 inches square, and $8\frac{1}{2}$ inches deep, will contain 538 cubic inches, or a peck, very near.

A box, 7 by 8 inches, and $4\frac{1}{4}$ inches deep, will contain 231 cubic inches, or a gallon exactly.

A box, 6 by 6 inches square, and $3\frac{1}{4}$ inches deep, will contain 117 cubic inches, or nearly half a gallon, (of $115\frac{1}{2}$ cubic inches.)

A box, 4 by 4 inches square, and $3\frac{1}{2}$ inches deep, will contain 56 cubic inches, or nearly a pint, (of $57\frac{1}{4}$ cubic inches.)

MICE, To Get Rid of.—To get rid of mice, use tartar emetic, mingled with any favorite food; they take it, get sick, and take their leave.

MICROSCOPE, Home-Made.—A simple microscope may be made out of a common pill-box for a few cents. Take out the bottom and put in a piece of window-glass; then paint the inside black, and make a small eye-hole in the lid. In this hole place a single drop of Canadian balsam, and allow it to cool. This drop of the transparent resin assumes, when cooling, the proper form of the glass lens, with considerable magnifying power.

MICROSCOPICAL OBJECTS, Mounting Fluid for.—Best gelatine, 1 oz., honey, 5 oz., distilled water, 5 oz., rectified spirit, $\frac{1}{2}$ oz., creosote, 6 drops. Dissolve the gelatine in the water by heat, and add to it the honey, previously made boiling hot. When cooled a little, add the creosote dissolved in the spirit, and, while still hot, filter through coarse filtering paper, or fine flannel. For use, the bottle in which it is contained may be set in a vessel of hot water.

MILK (Good), Composition of.—Milk is a fluid of white, yellowish-white, or bluish-white color, consisting largely of water, and holding in solution or suspension butter, sugar of milk, caseine, and certain salts. These substances are found generally in all unadulterated milk in constant proportions, except in cases of milk of cows diseased. The sum of the solid constituents, however, varies with the feed, stock, and condition of the animal: it should never fall below 12 per cent., ranging generally between 12 and 15 per cent., the rest being water. The composition may be assumed as follows:—

Butter.....	3.60 to	4.8 per cent.
Caseine.....	3.80 "	4.2 "
Sugar of milk...	4.2 "	4.5 "
Salts.....	0.6 "	0.8 "

12.2 14.3

There are cases, as in the Alderney breed, where the solids will rise as high as 16 and 17 per cent.; the butter as high as 9 per cent.; but such milk is never found in the market, being consumed altogether by the owners of the animals. On the other hand, there may be found milk, as in fresh milch cows, where the solids will go down to 10 per cent., the butter to 3; these are the extreme minimum limits, below which we should pronounce milk adulterated.

MILK, To Detect when Adulterated.—The cheapest and easiest method of adulterating milk is by adding water, and we may readily ascertain the exact extent of adulteration by the following plan. If a glass tube, divided into 100 parts, be filled with milk and left standing for 24 hours, the cream will rise to the upper part of the tube, and occupy from 11 to 13 divisions, if the milk is genuine.

MILDEW.—This term is generally applied to a particular moldy appearance on the leaves of plants, which is produced by innumerable minute fungi, which, if not checked in their growth, will occasion the decay and death of the parts on which they grow, and sometimes of the entire plant. In agriculture this appearance is frequently termed rust, and sometimes blight. It is common on wheat and on the hops; and in gardens on the leaves of the peach, the nectarine, and other fruit trees. The causes favorable to the production of mildew, are a rich soil and a moist atmosphere, without a free circulation of air or sunshine. In agriculture this parasitical disease is generally considered without remedy; but in gardening it may be checked by the application of powdered sulphur to the leaves covered by the fungi, which is found to destroy them without greatly injuring the leaf. Dry rot is only mildew of a more formidable kind.

MIRRORS, Platinized.—Much interest has been excited by the new method of constructing mirrors, invented by Dodé, of France, in which the chloride of platinum is used as a basis. For

this purpose the glass plate, after being cleaned, is set upright, and the metallizing liquid applied with a brush, first from above downward, then from right to left, and so on alternately until a perfectly uniform coating is laid on. The platinizing liquid is prepared by dissolving 1550 grains of very thin rolled platinum in aqua regia, and carefully evaporating the solution obtained in a sand-bath, and drying, so as to prevent the chloride of platinum from becoming decomposed. It is then spread out upon a glass muller, and rectified oil of lavender added, little by little, with continued rubbing. Care must be taken not to add the oil too quickly, as otherwise too great an increase of temperature may result, and thus destroy the preparation. After the addition of about fourteen times as much oil of lavender as of the platinum used, the mixture is to be placed in a porcelain dish, and allowed to remain perfectly quiet for 14 days, after which the liquid is to be poured off and filtered. After six days more of rest the liquid is to be decanted, and should then show five degrees upon the acid gauge of Baumé. To the quantity of platinum just mentioned about 400 grains of litharge and as much of borate of lead are to be added, the two substances being first rubbed up with 120 to 150 grains of oil of lavender, and then united as speedily as possible with the platinum liquid, after which it is ready for use, as mentioned. The coating of oil mixture thus applied is allowed to dry gradually, and the glass plate thus prepared is then to be introduced into a muffle of peculiar construction, in which the resinous substances are decomposed and converted into carbon, without melting or developing any bubbles, the remainder constituting a perfect platinum surface. Mirrors thus prepared have a high degree of lustre; and as the reflection is from the anterior face, it is immaterial what the character of the glass is, provided the surface be perfectly smooth and free from striae, or, indeed, whether it be transparent at all. This constitutes a great advantage over the ordinary method, where the transparency of the glass is an object of prime importance. Glass mirrors of this kind are translucent when held against the light, and may consequently be used to advantage in forming screens for windows of rooms, and inclosed spaces in offices and stores where it is desirable to be able to look out without difficulty, while at the same time concealed from the view of those on the other side. For this, however, it will be necessary that there be no window or other free opening opposite the plate-glass in question. It is said that the cost of platinum sufficient to prepare ten square feet of glass does not exceed twenty cents.

MOLDY SUBSTANCES in Rooms.—It has long been known that the presence of molds in rooms is highly injurious to human health; under certain conditions of dampness and bad ventilation, it is no uncommon thing to see mildew run all over a large expanse of white-washed wall or ceiling. If this mold occur in a living room, and it be not destroyed, it frequently brings on a complication of painful symptoms in the human patient, or, in other words, the membranes and tissues of the body are known to offer a fitting habitat for the plant, and it is transferred from the original objects to the human frame. A weak solution of hypo-chlorite of lime (bleaching powder) has recently been recommended as

a destroyer of molds in rooms, and as their growth is both common and rapid in this country in damp and ill-ventilated situations, the remedy is worth a trial.

MOLDING Figures in Paste.—Take the crumbs of a new-drawn white loaf, mold it until it becomes as close as wax, and very pliable; then beat it and roll it with a rolling-pin, as fine and as far as it will go; then point it on molds, and, when it has taken the suitable figure you desire, dry it in a stove, and it will be very hard; and to preserve it from vermin, you may mix a little powder of aloes with it.

MOLDING Small Figures in Jasper Color.—Oil your molds with a fine pencil, and diversify them with such colors as you please with gum tragacanth; if they spread or run, put a little of the gall of an ox, for the thicker it is the harder it will be; then mold your paste of the color of jasper, or the like, put it in to fill the mold, tie it with a wire, bake it, or take it out, repair and varnish it, and set it by to harden.

MOLDING Figures of Clay or Wax.—There is no need of many tools in this sort of work; the clay is placed upon an easel or table, and you begin and finish the work with your hands. Those who are used to it never make use of anything but their fingers, except three or four pieces of wood, which are roundish at one end, at the other flat, with a sort of claws and teeth, called by the French, *chauchoirs*—that is, a sort of hatchet; they are about seven or eight inches in length; those with claws are to smooth the stuff; the others, which have teeth, to scratch it.

They are made of wax thus: Take a pound of wax, half a pound of ocher, some add turpentine, and melt it together with oil of olives; put more or less, according as you would have the matter harder or softer; a little vermilion also should be mixed with it to give it a softer color. When you have made the composition, the figure is worked up with the hand, and those *chauchoirs* made use of in making up the earthen figures. Practice is the principal mistress in this sort of work, which, at first, is not so easy as that in clay.

MOLDING the Face of a Person in Wax.—Take a pound of new wax, a third of colophony, melt them at a slow fire, let them cool so long as that you may endure some of it on your hand without burning it; then having oiled the face with olive oil, cover the hair of the eye-lids and eyebrows with paste; then with a brush nimbly cover the face about the thickness of a quarter of a dollar, being careful not to stop the nostrils, and that the person squeeze not his eyes together, because that will render the face deformed.

Thus, having the face of wax, take it off gently and strengthen it with clay on the back side, that it may not give way. After this manner you may cast all sorts of faces; laughing, weeping, grimaces, or wry faces; also fruits or anything else, dividing the mold into two pieces with a warm knife; then fortify them with clay and join them together.

There is no way of casting neater than this with wax, and after a very little practice you can become very expert at the business.

MOLD in SAFES, To Prevent.—By the placing of a small lump of camphor in the safe, the accumulation of mold upon money, papers, books, etc., will be prevented.

MUCILAGE for Labels, Damp Proof.—Dissolve five parts of good glue in eighteen parts of water for a day, and to the liquid add nine parts of rock candy and three parts of Arabic. The mixture can be brushed upon paper while lukewarm; it keeps well, does not crack together, and when moistened, adheres firmly to bottles. For the labels of soda or seltzer-water bottles, it is well to prepare a paste of rye flour and glue, to which linseed oil, fish and turpentine have been added, in the proportion of half an ounce each to the pound. Labels prepared in the latter way do not fall off damp cellars.

MUCILAGE, Mold in.—Solutions of gum Arabic are very liable to become moldy; and to prevent the introduction of creosote, corrosive sublimate, etc., frequently used to remedy this evil, objectionable on account of the danger of poisoning, according to the *Industrie Blätter* a solution of quinine is a complete protection against mold, a very small quantity of it being sufficient to prevent gum mucilage from spoiling. It is possible that writing ink might be protected by the same application from a like difficulty. The use of ammonia for the same purpose is also recommended.

MUSTARD, Aromatic.—1. To 1 quart pure vinegar, add 2 tablespoonfuls each of ground black pepper and cinnamon, 1 do. of cloves, 3 do. of brown sugar, 4 do. salt, and 3 large onions cut

Boil until the strength is well extracted, $\frac{1}{2}$ or $\frac{3}{4}$ of an hour; then strain the vinegar through a cloth, and add 1 lb. best English mustard, and until it is perfectly smooth. If not thick enough, put more vinegar to the same spices, and mix. This keeps well in a fruit jar, and improves by age. Boiling the vinegar for a long time directed above would weaken its strength much. The flavor of the spices would be extracted equally well by keeping the mixture in a water-bath, boiling hot in a covered vessel.—2. Take 1 spoonful of ground mustard, 1 do. flour, 1 do. sugar, 1 teaspoonful salt, 1 do. black pepper, 1 do. cinnamon, 1 do. cloves. Mix smoothly with boiling vinegar and let stand several days before using. It may be thinned with vinegar. Will keep any length of time.

MUSICAL INSTRUMENTS, To Stain.—

Violon.—Boil 1 lb. of ground Brazil-wood in 2 quarts of water for an hour; strain it, and add an ounce of cochineal; boil it again for half an hour gently, and it will be fit for use.—**Pur-**—Boil a pound of chip logwood in 3 quarts of water for an hour; then add four ounces of alum.

AMES, Signification of.—

Am, *Hebrew*, a mountain.
Amah, *Hebrew*, vanity.
Aman, *Hebrew*, the father of many.
Amor, *Hebrew*, red earth.
Amor, *Saxon*, happiness and help.
Amor, *Saxon*, all bright.
Amor, *Greek*, a helper of men.
Amor, *Saxon*, all peace.
Amor, *Greek*, immortal.
Amor, *Hebrew*, a burden.
Amor, *Greek*, courageous.
Amor, *Latin*, flourishing.
Amor, *German*, a bold observer.
Amor, *German*, a maintainer of honor.
Amor, *British*, a strong man.
Amor, { *Latin*, venerable, grand.

Baldwin, *German*, a bold winner.
Bardolph, *German*, a famous helper.
Barnaby, *Hebrew*, a prophet's son.
Bartholomew, *Hebrew*, the son of him who made the waters to rise.
Beaumont, *French*, a pretty mount.
Bede, *Saxon*, prayer.
Benjamin, *Hebrew*, the son of a right hand.
Bennet, *Latin*, blessed.
Bernard, *German*, bear's heart.
Bertram, *German*, fair, illustrious.
Boniface, *Latin*, a well-doer.
Brian, *French*, having a thundering voice.
Cadwallader, *British*, valiant in war.
Cæsar, *Latin*, adorned with hair.
Caleb, *Hebrew*, a dog.
Cecil, *Latin*, dim-sighted.
Charles, *German*, noble-spirited.
Christopher, *Greek*, bearing Christ.
Clement, *Latin*, mild-tempered.
Conrad, *German*, able counsel.
Constantine, *Latin*, resolution.
Crispin, *Latin*, having curled locks.
Cuthbert, *Saxon*, known famously.
Daniel, *Hebrew*, God is judge.
David, *Hebrew*, well-beloved.
Denis, *Greek*, belonging to the god of wine.
Dunstan, *Saxon*, most high.
Edgar, *Saxon*, happy honor.
Edmund, *Saxon*, happy peace.
Edward, *Saxon*, happy keeper.
Edwin, *Saxon*, happy conqueror.
Egbert, *Saxon*, ever bright.
Elijah, *Hebrew*, God, the Lord.
Elisha, *Hebrew*, the salvation of God.
Ephraim, *Hebrew*, fruitful.
Erasmus, *Greek*, lovely, worthy to be loved.
Ernest, *Greek*, earnest, serious.
Evan or Ivon, *British*, the same as John.
Everard, *German*, well reported.
Eugene, *Greek*, nobly descended.
Eustace, *Greek*, standing firm.
Ezekiel, *Hebrew*, the strength of God.
Felix, *Latin*, happy.
Ferdinand, *German*, pure peace.
Francis, *German*, free.
Frederic, *German*, rich peace.
Gabriel, *Hebrew*, the strength of God.
Geoffery, *German*, joyful.
George, *Greek*, a husbandman.
Gerard, *Saxon*, all towardliness.
Gideon, *Hebrew*, a breaker.
Gilbert, *Saxon*, bright as gold.
Giles, *Greek*, a little goat.
Godard, *German*, a godly disposition.
Godfrey, *German*, God's peace.
Godwin, *German*, victorious in God.
Griffith, *British*, having great faith.
Guy, *French*, the mistletoe shrub.
Hannibal, *Punic*, a gracious lord.
Harold, *Saxon*, a champion.
Hector, *Greek*, a stout defender.
Henry, *German*, a rich lord.
Herbert, *German*, a bright lord.
Hercules, *Greek*, the glory of Hera or Juno.
Hezekiah, *Hebrew*, cleaving to the Lord.
Horatio, *Italian*, worthy to be beheld.
Howel, *British*, sound or whole.
Hubert, *German*, a bright color.
Hugh, *Dutch*, high, lofty.
Humphrey, *German*, domestic peace.
Jacob, *Hebrew*, a supplanter.
James or Jacques, beguiling.

- Ingram, *German*, of angelic purity.
 Joab, *Hebrew*, fatherhood.
 Job, *Hebrew*, sorrowing.
 Joel, *Hebrew*, acquiescing.
 John, *Hebrew*, the grace of the Lord.
 Jonah, *Hebrew*, a dove.
 Jonathan, *Hebrew*, the gift of the Lord.
 Joscelin, *German*, just.
 Joseph, *Hebrew*, addition.
 Josias, *Hebrew*, the fire of the Lord.
 Joshua, *Hebrew*, a Saviour.
 Isaac, *Hebrew*, laughter.
 Lambert, *Saxon*, a fair lamb.
 Lancelot, *Spanish*, a little lance.
 Laurence, *Latin*, crowned with laurels.
 Lazarus, *Hebrew*, destitute of help.
 Leonard, *German*, like a lion.
 Leopold, *German*, defending the people.
 Lewellin, *British*, like a lion.
 Lewis, *French*, the defender of the people.
 Lionel, *Latin*, a little lion.
 Lucius, *Latin*, shining.
 Luke, *Greek*, a wood or grove.
 Mark, *Latin*, a hammer.
 Martin, *Latin*, martial.
 Mathew, *Hebrew*, a gift or present.
 Maurice, *Latin*, sprung of a Moor.
 Meredith, *British*, the roaring of the sea.
 Michael, *Hebrew*, who is like God?
 Morgan, *British*, a mariner.
 Moses, *Hebrew*, drawn out.
 Nathaniel, *Hebrew*, the gift of God.
 Neal, *French*, somewhat black.
 Nicolas, *Greek*, victorious over the people.
 Noel, *French*, belonging to one's nativity.
 Norman, *French*, one born in Normandy.
 Obadiah, *Hebrew*, the servant of the Lord.
 Oliver, *Latin*, an olive.
 Orlando, *Italian*, counsel for the land.
 Osmund, *Saxon*, house peace.
 Oswald, *Saxon*, ruler of a house.
 Owen, *British*, well descended.
 Patrick, *Latin*, a nobleman.
 Paul, *Latin*, small, little.
 Percival, *French*, a place in France.
 Peregrine, *Latin*, outlandish.
 Peter, *Greek*, a rock or stone.
 Philip, *Greek*, a lover of horses.
 Phineas, *Hebrew*, of bold countenance.
 Ralph, contracted from Radolph, or Randal, or Ranulph, *Saxon*, pure help.
 Raymund, *German*, quiet peace.
 Reuben, *Hebrew*, the son of vision.
 Reynold, *German*, a lover of purity.
 Richard, *Saxon*, powerful.
 Robert, *German*, famous in counsel.
 Roger, *German*, strong counsel.
 Rowland, *German*, counsel for the land.
 Rufus, *Latin*, reddish.
 Solomon, *Hebrew*, peaceable.
 Samson, *Hebrew*, a little son.
 Samuel, *Hebrew*, heard by God.
 Saul, *Hebrew*, desired.
 Sebastian, *Greek*, to be revered.
 Simeon, *Hebrew*, hearing.
 Simon, *Hebrew*, obedient.
 Stephen, *Greek*, a crown or garland.
 Theobald, *Saxon*, bold over the people.
 Theodore, *Greek*, the gift of God.
 Theodosius, *Greek*, given of God.
 Theophilus, *Greek*, a lover of God.
 Thomas, *Hebrew*, a twin.
 Timothy, *Greek*, a fearer of God.
 Toby or Tobias, *Hebrew*, the goodness of the Lord.
 Valentine, *Latin*, powerful.
 Vincent, *Latin*, conquering.
 Vivian, *Latin*, living.
 Walter, *German*, a wood master.
 Walwin, *German*, a conqueror.
 William, *German*, defending many.
 Zaccheus, *Syriac*, innocent.
 Zachary, *Hebrew*, remembering the Lord.
 Zebedee, *Syriac*, having an inheritance.
 Zedekiah, *Hebrew*, the justice of the Lord.
 Adeline, *German*, a princess.
 Agatha, *Greek*, good.
 Agnes, *German*, chaste.
 Alethea, *Greek*, the truth.
 Althea, *Greek*, hunting.
 Alice, Alicia, *German*, noble.
 Amy, Amelia, *French*, a beloved.
 Anna, Anne, or Hannah, *Hebrew*, gracious.
 Arabella, *Latin*, a fair altar.
 Aureola, *Latin*, like gold.
 Barbara, *Latin*, foreign or strange.
 Beatrice, *Latin*, making happy.
 Benedicta, *Latin*, blessed.
 Bernice, *Greek*, bringing victory.
 Bertha, *Greek*, bright or famous.
 Blanche, *French*, fair.
 Bona, *Latin*, good.
 Bridget, *Irish*, shining bright.
 Cassandra, *Greek*, a reformer of men.
 Catharine, *Greek*, pure or clean.
 Charity, *Greek*, love, bounty.
 Charlotte, *French*, all noble.
 Caroline, *feminine of Carolus, the Latin of Charles*, noble-spirited.
 Chloe, *Greek*, a green herb.
 Christiana, *Greek*, belonging to Christ.
 Cecilia, *Latin*, from Cecil.
 Cicely, a corruption of Cecilia.
 Clara, *Latin*, clear or bright.
 Constance, *Latin*, constant.
 Deborah, *Hebrew*, a bee.
 Diana, *Greek*, Jupiter's daughter.
 Dorcas, *Greek*, a wild roe.
 Dorothy, *Greek*, the gift of God.
 Edith, *Saxon*, happiness.
 Eleanor, *Saxon*, all fruitful.
 Eliza, Elizabeth, *Hebrew*, the oath of God.
 Emily, corrupted from Amelia.
 Emma, *German*, a nurse.
 Esther, Hester, *Hebrew*, secret.
 Eve, *Hebrew*, causing life.
 Eunice, *Greek*, fair victory.
 Eudoia, *Greek*, prospering in the way.
 Frances, *German*, free.
 Gertrude, *German*, all truth.
 Grace, *Latin*, favor.
 Hagar, *Hebrew*, a stranger.
 Helena, *Greek*, alluring.
 Jane, *softened from Joan; or, Janne, the feminine of John*.
 Janet, Jeannette, little Jane.
 Joyce, *French*, pleasant.
 Isabella, *Spanish*, fair Eliza.
 Judith, *Hebrew*, praising.
 Julia, Juliana, *feminine of Julius*.
 Letitia, *Latin*, joy or gladness.
 Lois, *Greek*, better.
 Lucretia, *Latin*, a chaste Roman lady.
 Lucy, *Latin, feminine of Lucius*.
 Lydia, *Greek*, descended from Lud.

Mabel, *Latin*, lovely.
 Magdalene, *Maudlin, Syriac*, magnificent.
 Margaret, *German*, a pearl.
 Martha, *Hebrew*, bitterness.
 Mary, *Hebrew*, bitter.
 Maud, Matilda, *Greek*, a lady of honor.
 Mercy, *English*, compassion.
 Mildred, *Saxon*, speaking mild.
 Nest, *British*, the same as Agnes.
 Nicola, *Greek*, feminine of Nicolas.
 Olympia, *Greek*, heavenly.
 Orabilis, *Latin*, to be entreated.
 Parnell, or Petronilla, little Peter.
 Patience, *Latin*, bearing patiently.
 Paulina, *Latin*, feminine of Paulinus.
 Penelope, *Greek*, a turkey.
 Persis, *Greek*, destroying.
 Philadelphia, *Greek*, brotherly love.
 Philippa, *Greek*, feminine of Philip.
 Phoebe, *Greek*, the light of life.
 Phyllis, *Greek*, a green bough.
 Priscilla, *Latin*, somewhat old.
 Prudence, *Latin*, discretion.
 Psyche, *Greek*, the soul.
 Rachel, *Hebrew*, a lamb.
 Rebecca, *Hebrew*, fat or plump.
 Rhoda, *Greek*, a rose.
 Rosamund, *Saxon*, a rose of peace.
 Rosa, *Latin*, a rose.
 Rosecleer, *English*, a fair rose.
 Rosabella, *Italian*, a fair rose.
 Ruth, *Hebrew*, trembling.
 Sabina, *Latin*, sprung from the Sabine.
 Salome, *Hebrew*, perfect.
 Sapphira, *Greek*, like a sapphire stone.
 Sarah, *Hebrew*, a princess.
 Sibylla, *Greek*, the counsel of God.
 Sophia, *Greek*, wisdom.
 Sophronia, *Greek*, of a sound mind.
 Susan, Susanna, *Hebrew*, a lily.
 Tabitha, *Syriac*, a roe.
 Temperance, *Latin*, moderation.
 Theodosia, *Greek*, given by God.
 Tryphosa, *Greek*, delicious.
 Tryphena, *Greek*, delicate.
 Vida, *Erse*, feminine of David.
 Ursula, *Latin*, a female bear.
 Winifred, *Saxon*, winning peace.
 Zenobia, *Greek*, the life of Jupiter.

NITRO-GLYCERIN.—When glycerin is allowed slowly to trickle into a mixture of equal measures of nitric acid and oil of vitriol, at a low temperature, two atoms of its hydrogen are replaced by two atoms of protoxide of nitrogen, and there results a heavy oily liquid known as nitro-glycerin, a body which has more than ten times the explosive power of gunpowder. It has come into extensive use for blasting, and the number of terrible accidents that have happened from it, by explosion from mere friction, illustrates not only the tremendous forces that can be stored up in the shape of atomic tensions, but how exquisite is the balance by which such terrible agencies are kept in equilibrium.

This terrible explosive seems little to respect its company and surroundings. Dr. Gorup Besamez reports the account of an explosion of ten drops of the substance in his laboratory, and the astonishing effects he records as resulting from this explosion are well calculated to give a most respectable and respectful notion of the properties of nitro-glycerin. One of the doctor's pupils, in the course of an investigation,

placed the above mentioned quantity of the substance in question in a small cast iron dish heater over the small Bunsen gas burner in common use in laboratories. Result: forty-six panes of glass in the windows of the laboratory demolished, the iron dish hurled through a brick wall, the iron stand upon which it was supported partly split and partly twisted out of shape, and the tube of the Bunsen burner split and flattened. Those in the laboratory, fortunately, escaped without injury. This circumstance confirms the results of Dr. E. Kopp's observations upon the conditions upon which nitro-glycerin explodes or quietly burns. When caused to fall drop by drop on an iron plate at a full red heat, it burns off like gunpowder; but should the iron plate not be thoroughly red, but still sufficiently heated to make the nitro-glycerin boil suddenly, an explosion invariably occurs. The latter must have been the conditions under which the nitro-glycerin was heated in the case above cited. Nobel claims that nitro-glycerin can be rendered perfectly harmless and safe for transportation by mixing it with ten per cent. of wood spirit or methylic alcohol. When required for use this added substance must be removed, its removal bringing the explosive back to its original dangerous state. An admixture with twenty-five per cent. of its weight of sand will, it is said, allow it to burn quietly without explosion, but if struck with a sudden and violent blow, it takes fire, but only the portion struck burns. Such a mixture, now known as dynamite, may be exploded by means of fulminate of mercury, itself fired by the electric spark or by a slow match.

OIL (Lamp), To Purify.—Take chloride of lime, 1 lb.; water, 12 lbs. Triturate the chloride of lime in a large mortar, gradually adding the water so as to form a smooth and soap paste, and then add the remainder of the water, which will give the whole the consistence of cream. Now mix this thoroughly with the oil by frequent and careful stirring, in the proportion of 1 quart of the paste for 100 lbs. of oil, or a little more, if the oil be very putrid. Let it remain a few hours, when add 1 lb. of sulphuric acid, previously diluted with 20 or 30 parts of water, and boil, with a gentle heat, constantly stirring during the process, until the oil drops clear from the end of a piece to be dipped into it. After the boiling has been finished, allow the oil to settle for a few hours; then draw it off from the acidulated water. The boiler should be lined with lead, and the mortar for the trituration of the chloride of lime should neither be iron nor copper.

OIL, Neat's-Foot.—In the manufacture of this oil the bones of the foot only are used after rejecting the hoofs. In the hind feet of the animals the foot goes up to the first point, which bends inside, presenting a very large bone. These bones, as fresh and as clean as possible, are boiled for half an hour in a suitable vessel, and the oil after cooling is poured or syphoned off. It is then filtered through a piece of flannel and is ready for use. If the bones are not fresh the oil may have a disagreeable odor, and it has then to be purified, which can be done by shaking it with a weak solution of bleaching powder, to which a little hydrochloric acid has been added, washing it with water and filtering. The solid fats are removed, melted again, poured through muslin, and constitute when odorless an excel-

lent material for pomatums. If they are rancid they may be sold to the soap makers.

OILS of Orange and Lemon, To Preserve.—To every pound of oil 1 oz. of alcohol is to be added, and well mixed; then 1 oz. of water is put with it, which again withdraws the alcohol from the oil, and collects at the bottom of the bottle as dilute alcohol.

OIL-PARCHMENT.—According to Dr. J. C. Hofmann's directions for the preparation of what he calls oil-parchment, the basis may be either linen or cotton-cloth, or even strong paper. The material, whichever is chosen, is to be stretched out, and then covered with the following preparation: One part of fine white lead, two-thirds of a part of well burnt ground and sifted plaster of Paris, and one-fourth of a part of fine slaked lime are intimately mixed and ground with water until a perfectly smooth, doughy mass is obtained. Then two-thirds of a part of best clear glue, dissolved in sufficient water, is gradually added until the mass is of such a consistence that it can be easily spread with a brush. Three or four layers of this are to be put upon the cloth, one being allowed to get thoroughly dry before another is put on. The last, when dry, is to be rubbed down smooth with pumice stone. The ground is now ready for the surface of oil or paint. If a white surface is desired, a mixture of one part of best linseed oil and one-third of well-bleached lead-varnish alone is used; but this mixture, if wished, may be colored yellow with ochre, red with cinnabar, blue with Prussian blue, or black with Frankfort black. Three or four thin layers of the paint may be applied, care being again taken that each coat is well dried before another is laid on. The oil, we are told, unites to the other surface so as to form a solid material, which is quite impervious to water, and cannot be rubbed off. The material so prepared may be written upon with a lead or colored pencil, and the writing or drawing can be washed off again any number of times. It might be expected that the mixture with plaster of Paris, which forms the groundwork, would set into a solid mass too quickly to allow of three or four coats of the same mixture being applied, but the author gives no intimation of such a danger.

OIL, for Railway Cars and Machinery.—Soda, 56 lbs., thoroughly dissolved in 3 gals. water in a small boiler; then to be poured into a large cooler containing 30 to 36 gals. water, and well mixed: melt 1 cwt. 2 qrs. of tallow in a large boiler, then add 1 cwt. 3 qrs. of palm-oil; boil together; as soon as it boils, the mixture is to be gradually cooled down to blood heat, stirring all the time. It is then to be run off through a sieve into the cooler containing the soda and water; and must be stirred all the time it is running off, in order to mix properly.

OIL (Rape), To Purify.—Rape oil, 100 gallons; strong oil of vitriol, 2 gallons. Put them into a cask and agitate for one hour, decant the clear oil in three days, and then divide the oil into two portions and put each into separate casks, add forty or fifty gallons of hot water to each, and agitate for one hour more; in three days or more, decant the clear for use.

OLEOGRAPHS: Marbled Paper.—A so-called novelty has been advertised in England lately, under this name. It is simply paper, on which peculiar accidental figures are formed by

the following process: Oil is dropped on water; paper is laid on the surface; this is allowed to float an instant, and then drawn through ink, and washed with water. It appears to us that the main principle of this so-called novel method is identical with the manner in which thus far all marbled papers have been manufactured, namely, a shallow bath of water mixed with some ox-gall is prepared and sprinkled with water-colors mixed with gum, etc., on the surface, so that they float and form all kinds of accidental figures. Then a sheet of white paper is laid on the water for an instant, and taken up directly; after which it is dried.

PACKING, Hints on.—In packing up a parcel of books, be careful, in order to preserve them from rubbing, to place a sheet of white paper over the cover of each, and pack the books together in such a way that one will bind the other, and thus form a secure parcel. Use abundance of wrapping-paper and strong cord. If the parcel exceeds twelve inches in breadth, draw a cord tightly, but not too much so, round the sides, which will materially aid in keeping it secure and compact. As a rule, furniture and earthenware should be packed by those who are accustomed to it. The packing of flowers and fruit may be left in the hands of the gardener. Every packer should be very careful in driving nails into packed boxes; screws are much to be preferred. In packing articles which are liable to break, place the heaviest articles at the bottom, and see that plenty of straw, soft paper, and paper shavings are provided, wherewith to wrap up and separate each particular article. Packages of glass and other fragile materials ought to be marked "Brittle (or fragile), with care," in plain and conspicuous letters on the parcel, or packing case.

PAINT, To Remove from Stone.—A writer having to clean a pulpit and sedilia in which the carving and tracery were almost filled up with successive coats of paint, was informed that common washing-soda, dissolved in boiling water, and applied hot, would remove it. He says, "I found that 3 lbs. of soda, (cost 2½d.) to a gallon of water, laid on with a common paint-brush, answered the purpose admirably, softening the paint in a short time, so that it was easily removed with a stiff scrubbing-brush; afterward, on adding a few ounces of potash to the solution, it softened more readily than with soda only. The stone in both cases was a fine freestone."

PAPER, Copying.—Mix lard and lampblack to a paste, rub this over paper, wipe off the waste with a rag, and dry the paper. A clean sheet placed under this while written on with a lead pencil, etc., receives a copy.

PAPER, Leather.—One of the most interesting and peculiar productions of paper is that which is made to imitate leather. The surface has every appearance of a finished skin, with extraordinary firmness and elasticity, and it can be subjected to washing without any injury from the water. These peculiarities are not so much due to the superior quality of the material as to the mode of manufacture, the surfaces remaining intact even when the paper is very thick, while with us paper of this kind soon loses its firmness, and the grain is impaired.

Japanese "leather" paper is made extensively at Flangawa, near Yeddo. It is made in sheets of 60 centimetres in length and 42 centimetres in

width. The paper out of which it is prepared is not dissimilar to our packing-paper, and is made in Southern Japan, near Nagasaki, and thence taken to other provinces, where it is manufactured into the different forms, for various uses. The leather paper is made in the following manner:—It is dampened and laid in pairs between two peculiarly prepared forms, made of paper also, only more highly varnished than ordinary leather paper; they have a very strong surface coating, but running only in one direction.

Before putting the paper in these forms, the sheets are stretched a little in the direction of their width. If there are several sheets they are rolled on a cylindrical piece of wood, the grain of the paper running in an opposite direction from that of the wood; they are then unrolled from this on a cloth to keep them in shape, and put into a form, with a hole in the top large enough to admit the end of the wooden cylinder. The roll of the paper is then subjected to a pressure of 200 or 300 pounds. After the roll has been reduced to three-quarters of its original length by this pressure, it is taken out of the press and turned, the folds flattened out, and again pressed to remove the deep marks.

After passing the paper through rollers several times, the upper surface acquires the appearance of leather; it is then colored, oiled with a kind of rape-seed oil, varnished, put once more in the press, which completes it, with the exception of drying. By means of parallel or cross lines on the rollers, the upper surface of the paper is made to resemble leather exactly in all its varieties. The paper being pressed to one-third, or even to one-half, its original thickness, and the passage through the rollers giving it a fine-grained appearance, makes it valuable to picture-printers, as the surface has the appearance of *crêpe silk*.

There is another variety of leather paper which is smooth and transparent, resembling hog-skin very much. This is manufactured by a process of hammering, and is the highest priced, costing 27 cents per sheet, while the other ranges from 8 to 14 cents, some very fine selling at 8 cents per sheet.

PAPER from Oat Refuse.—Paper is manufactured from oat refuse by first immersing the oat husks in water in a tank in order to float off mustard and other seeds, with which they are frequently more or less mixed, and which, if not separated, materially deteriorate the quality of the paper. It is of advantage to have the water well stirred, as it facilitates the separation of the foreign seeds, and allows them to float to the surface. The oat husks are then allowed to settle, and the surface scum and floating seeds are drawn off by an overflow pipe at the top of the tank, or skimmed off by a rake or other tool, or otherwise removed; after which the water is drained from the oat husks by a waste-water pipe at the bottom of the tank, and beneath a perforated false bottom, or fitted with a strainer which retains the oat husks. The oat husks may be left to steep in the water for from five to ten hours after or during the removal of the scum, as this steeping, by softening them and helping to loosen the silica from the fibre, facilitates the subsequent boiling process.

PAPER, Oiled.—Brush sheets of paper over with boiled oil, and suspend them on a line until dry. This paper is water-proof, and is employed to tie over preserve pots and jars, and to wrap up paste blacking, etc.

PAPER, Parchment.—To convert paper into vegetable parchment, immerse it for a few seconds in a cold mixture of one volume water and two volumes sulphuric acid. Wash out rapidly by plunging into a large quantity of cold water; and finally remove all traces of the acid by further immersion in water, to which a small quantity of ammonia has been added. On drying, the parchment has a tendency to contract unequally. This can be prevented by attaching it to a frame while still wet, or by allowing it to dry under a press.

Paper prepared in this way is very transparent, and can be used for copying by tracing. It is also extensively employed as a substitute for parchment made from sheepskin in diplomas, certificates, patents, and for letter envelopes.

The precautions to be observed in its manufacture are, not to keep it too long in the bath, and afterward to be sure to remove every trace of the acid.

The applications of parchment paper are daily extending. A recent number of a Breslau paper gives an account of some specimens prepared by Albert Eckstein, of Vienna, which are capable of a great variety of uses. One variety can be employed as a substitute for cloth in binding, and a thicker variety for imitation of half-calf bindings. One of the most important applications is to prepare ice-sacks for medical use. These bags are a great improvement on the India rubber or beef-bladder bags usually employed for this purpose. The parchment bag, in consequence of the slow escape of the water through the membrane, is kept constantly cold, and no change of its contents becomes necessary. The evaporation of the water from the surface keeps down the temperature of the contents of the bag. Parchment paper is also recommended for wrappers for goods which may be injured by dust or moisture, and is prepared for this purpose.

The principal use, however, of the parchment paper at present is as a porous membrane in the refining of sugar. This paper will separate different impurities, and finally the crystallizable sugar from molasses, if placed between the latter substance and water. This peculiar action of the pores of the paper is called *osmose*, and the whole operation diffusion. Dubrunfaut some three or four years ago introduced this system for the refining of sugar into Germany and France. Extensive pieces of apparatus have been constructed for this purpose, called *osmometers* and *osmogenes*.

PAPER, or Parchment, To Stain.—Yellow.

—Paper may be stained a beautiful yellow by the tincture of turmeric formed by infusing an oz. or more of the root, powdered, in a pint of spirit of wine. This may be made to give any tint of yellow, from the lightest straw to the full color, called French yellow, and will be equal in brightness even to the best dyed silks. If yellow be wanted of a warmer or redder cast, annatto or dragon's blood must be added. The best manner of using these, and the following tinctures, is to spread them even on the paper or parchment, by means of a broad brush, in the manner of varnish. **Crimson.**—A very fine crimson stain may be given to paper by a tincture of the Indian lake, which may be made by infusing the lake some days in spirit of wine, and then pouring off the tincture from the dregs. It may be stained

red by red ink. It may also be stained of a scarlet hue by the tincture of dragon's blood in spirit of wine, but this will not be bright. *Green*.—Paper or parchment may be stained green by the solution of verdigris in vinegar, or by the crystals of verdigris dissolved in water. *Orange*.—Stain the paper or parchment first of a full yellow by means of the tincture of turmeric, then brush it over with a solution of fixed alkaline salt, made by dissolving $\frac{1}{2}$ an oz. of pearlsh, or salt of tartar, in a quart of water, and filtering the solution. *Purple*.—Paper or parchment may be stained purple by archil, or by the tincture of logwood. The juice of ripe privet-berries expressed will also give a purple dye.

The coal-tar colors are especially adapted to coloring paper.

PAPER, Tracing.—In order to prepare a beautiful transparent, colorless paper, it is best to employ the varnish formed with Demarara resin in the following way: The sheets intended for this purpose are laid flat on each other, and the varnish spread over the uppermost sheet by means of a brush, until the paper appears perfectly colorless, without, however, the liquid therein being visible. The first sheet is then removed, hung up for drying, and the second treated in the same manner. After being dried, this paper is capable of being written on, either with chalk, or pencil, or steel pens. It preserves its colorless transparency without becoming yellow, as is frequently the case with that prepared in any other way.

PAPER, To Make Transparent.—Any paper is capable of the transfer of a drawing in ordinary ink, pencil, or water color, and even a stout drawing paper can be made as transparent as the thin yellowish paper at present used for tracing purposes. The liquid used is benzine. If the paper is dampened with pure and fresh distilled benzine, it at once assumes transparency, and permits of tracing being made, and of ink or water colors being used on its surface without any "running." The paper resumes its opacity as the benzine evaporates, and if the drawing is not then completed, the requisite portion of the paper must again be dampened with the benzine. This new discovery of the properties of benzine will prove of service to the art profession, in allowing the use of stiff paper where formerly only a slight tissue could be used.

PAPER, Test for Wood in.—A weak solution of sulphate of aniline is now used for detecting the presence of wood fiber in paper. One drop of the liquid on a pointed glass rod applied to paper containing such fiber, even in minute quantities, if prepared in a mechanical way, will produce an intense yellow color. This reaction does not take place when the wood fiber has been chemically prepared.

PAPER, Waxed.—Place a sheet of stout paper on a heated iron plate, and over this place the sheets of tissue paper to be waxed. Inclose wax or stearine in a piece of muslin, and as it melts spread over the tissue paper equally; proceed with others similarly until enough are prepared. Used to cover gallipots, ointments, etc.

PASTE, Resembling the Diamond.—Take white sand, 1800 parts; red lead, 1200 parts; pearlsh, 900 parts; nitre, 600 parts; arsenic, 100 parts; manganese, 1 part. To render this paste still harder, use less lead, and if it should incline to yellow, add a little more manganese.

PASTE (Improved), for Walls.—A new form of paste for attaching paper hangings to walls, and one which, besides possessing the merit of cheapness, has the advantage of preventing the paper from separating or peeling off, is prepared by first softening 18 lbs. of finely powdered bole (fatty clay) in water, and then draining off the surplus water from the mass. One and a quarter pounds of glue are next to be boiled into glue water, and the bole and 2 lbs. of gypsum are then stirred in, and the whole mass forced through a sieve by means of a brush. This is afterward diluted with water to the condition of a thin paste or dressing, when it is ready for use. The paste is not only much cheaper than the ordinary flour paste, but it has the advantage of adhering better to whitewashed surfaces, especially to walls that have been coated over several times, and from which the coating has not been carefully removed. In some cases it is advisable, when putting fine paper on old walls, to coat them by means of this paste with a ground paper, and to apply the paper hanging itself to this with the ordinary paste.

PASTE, for Labeling on Tin.—Any paste, such as you buy in commerce, or make yourself from gum-arabic or gum-tragacanth, with the addition of a little wintergreen oil, will do for this purpose. It is only necessary to remove from the tin a thin film of grease which prevents perfect adhesion, causing it to blister off on drying. This is accomplished by dipping a rag in a dilute solution of caustic soda or potash—ten of water to one of potash—rubbing the spot on which to fix the label, and drying it with another rag. No label put on in this way will come off again.

PASTILLES, Vanilla.—Pastilles which give out the scent of vanilla may be thus prepared: Galbanum, twenty-four parts; cloves, sixteen parts; vanilla, thirty-two parts; essence of cloves, one part; and essence of vanilla, sixteen parts; all the ingredients being well powdered and mixed into a mass of mucilage of gum arabic. Liquid compositions of a similar nature may also be prepared, and of which a small quantity may be poured into a saucer and ignited. A fluid of this kind may be formed of gum benzoin, thirty-two parts; gum galbanum, twenty-four parts; and bruised cloves, seventeen parts. The materials are to be well broken up into fragments and put into a stoppered bottle, with a sufficient quantity of rectified spirits of wine to dissolve the gums. The vessel must be kept in a warm place for some time, until the benzoin and galbanum are dissolved, and then the clear liquor should be decanted into another bottle, and preserved for use.

PATENT MEDICINES, Composition of.—*Coca Pills*, by Sampson, New York. According to Hagar and Jacobsen, composed of powdered coca and extract of cocain about equal quantities; value about one-fourth of price.

Eau de Cythere, a hair color restorer, consists of 4 chloride of lead, 8 hyposulphite of soda, 88 water. A similar composition was *Eau de fees*, which, a couple of years ago, was introduced here. The writer found in a sample also some alkalies, earths, and traces of nitric acid, originating probably in the spring or pump water used. Hagar and Jacobsen give the following formula: Hyposulphite of lead $1\frac{1}{4}$, hyposulphite of soda 3, glycerine 7, water 88 parts.

Granular Effervescent Citrate of Magnesia, by Bishop, of London, consists merely of bicarbonate of soda, and tartaric acid.

Pommade des Châtelainier, a hair invigorator, consists of benzoinated lard and some volatile oils.

Hamburg Tea, by Frese & Co., of Hamburg: Senna 8, manna 3, coriander 1.

Magnesian Aperient, by Moxon, of England, is, according to Siller, anhydrous sulphate of magnesia 31, carbonate of magnesia 14, bicarbonate of soda 30, tartaric acid 25 parts.

Lait de Perles, according to Dragendorff, 1 white lead, 7 rose water.

Swedish Essence of Life is made also in this country, under various names. As usually made by apothecaries, it is a tincture prepared from 4 aloes, 1 agaric, 1 rhubarb, 1 zedoary, 1 gentian, 1 myrrh, 1 theriac, with 100 to 120 dilute alcohol. The secret medicine manufacturers usually substitute cheaper articles for the high-priced saffron and rhubarb.

Syrup of Horseradish, by Grimault. Hagar gives the following directions: 50 p. each of fresh scurvygrass, buckbean, and watercress, 60 of horseradish, 40 of fresh orange berries, are infused with 3 cinnamon in 50 p. white wine, and after a day expressed; 250 p. sugar are dissolved in the filtrate.

Iodized Syrup of Horseradish, by Grimault, contains 10 iodine and 5 potassium iodide in 8,000 of the former.

Syrup de Lait Iodique, by Bouyer, of Paris. 200 cow's milk, 60 cane sugar, a little soda, and 1-6 of potassium iodide, are evaporated to 100 parts.

Myrrhine, by J. B. George, of Paris, for the preservation of the teeth: Glycerine 38, myrrh 7, arrowroot 5, chalk 54, oil of cinnamon 1 part.

New York Pills, by Sampson, of New York. The $1\frac{1}{2}$ grain pills consist of powdered coca 25, extract of coca 30, powdered iron 35 parts.

Opiate pour les Dents, by Pinaud. Syrup 70, chalk 21, gypsum $7\frac{1}{2}$, magnesia $1\frac{1}{2}$, colored with aniline red, containing arsenic, and flavored with oil of cloves, and of spearmint.

Brandreth's Pills contain resin of podophyllum, inspissated juice of poke berries, saffron, cloves, oil of peppermint.

Holloway's Pills are composed of aloe, myrrh, and saffron.

Morrison's Pills, $2\frac{1}{2}$ grains each, consist of aloe, cream of tartar and colocynth; another kind contains the same ingredients, besides gamboge.

Radway's Ready Relief, according to Peckolt, is an ethereal tincture of capsicum, with alcohol and camphor.

Radway's Renovating Resolvent, a vinous tincture of ginger and cardamom sweetened with sugar. (Hagar and Jacobsen.)

Poudre Hémostatique Végétal, by Bonnatour, consists of 4 resin, 1 gum arabic, 1 wood charcoal.

Poudre Unique, by Godernaux, of Paris, lauded as a specific against epilepsy, is impure calomel, leaving when heated a slight reddish residue.

Oil of Horse Chestnuts, by E. Genevoix, of Paris, is not the oil of the horse chestnuts, but another non-drying oil, altered by heat so that it has acquired a darker color, a pungent odor and acid taste.

PAVEMENT, Street.—A new mode of laying granite pavement has been tried in London, in a part of the city in which it will be subjected

to the severest test of heavy traffic. The plan consists of laying down granite blocks of 6 by 4 inches on a simple bed and filling in the interstices with a very coarse gravel, and then pouring on a very hot coal tar. This liquid runs down between the blocks to the bottom, and firmly cements the whole pavement into one mass, which is thus rendered impervious to water from above or from below, consequently the rain at once runs off, and the bed always remaining dry, no pumping up of mud can occur from between the blocks of granite, so that the pavement always remains clean, and neither mud in wet weather, nor dust in dry weather, can arise where this mode is adopted. This pavement has already proved a success in Manchester, and great hopes are entertained of the experimental section laid down in London. As much interest is aroused in several of our own cities, and many experiments made to find a good pavement, perhaps the above may prove useful. Thus far none of the pavements laid down in this country seem entirely satisfactory. The wood, of which high expectations were entertained, is too expensive, inconvenient to repair, besides having disadvantages. Stone in some form seems destined to maintain its ground.

PEARL INLAYING.—Mother of pearl is the inner coat or layer of several kinds of oyster-shells. Its beautiful tints are dependent upon its structure, the surface being covered with minute grooves so small that upward of three thousand are contained in an inch, which decompose and reflect the light.

The kinds of pearl used are three: mother of pearl or the pearl oyster, or white pearl, as it is called by the artist, and is known by its clear white surface; aurora shell, which can readily be told by its wrinkled appearance and its various prismatic colors, made from the shell of the genus of mollusca known as the sea-ear or ear-shell, and known to the conchologist as haliotis; the green snail shell, which can be told by its glistening colors of light and dark green; a soft yellow, and a bright and beautiful pink, blended together.

The lamellar structure of the pearl shell readily admits of its being split into laminae; but as splitting is liable to spoil the shell, the pieces are generally made to take the required shape by the use of the saw, file, or grindstone. In preparing the rough shell, if square or angular pieces are required, the circular saw or the ordinary back-saw is used; while if a circular form is wanted, it is cut by an annular or crown-saw fixed on a mandrel.

After being cut out, the pieces are ground to the necessary thinness on a grindstone, plenty of water being used to avoid the great friction which always ensues; after which, they are ready for operation in the lathe for inlaying, etc.

After the shell is ground or turned to the proper form, it is rubbed with pumice-stone and water, following by an application of ground pumice-stone, which has been carefully sifted to extract all except the minutely powdered portion, and applied with a piece of cork or damp cloth. The polishing is accomplished with rotten-stone moistened with dilute sulphuric acid, the latter tending to develop the striated structure of the shell. In some cases emery paper may be used, followed with rotten-stone moistened with acid or some limpid oil instead.

The pearl handles used for razors or knives are first roughed out, then drilled where the rivets are to be inserted, and then lightly riveted together in pairs. They are then ground to the proper size and thickness, and finished by the means mentioned.

One process of working pearl is similar to that of engraving in metals in relief, by the aid of corrosive acids and the etching point. The shell is first divided as may be necessary, and the design or patterns drawn upon it with an opaque varnish; strong nitric acid is then brushed over the plates repeatedly, until the parts untouched or undefended by the varnish are sufficiently corroded or eaten away by the acid. The varnish now being washed off, the device, which the acid has not touched, is found to be nicely executed. If the design is to be after the manner of common etching on copper, the process upon the shell is precisely the same as that process upon metal.

When a considerable number of pieces of thin shell are required to be of the same size and pattern, the requisite number of plates are cemented together with glue, and the device or figure drawn upon the outer plate. They may then be held in a vise or clamp, and cut out as one plate with a fine saw, or wrought into the desired form with files; drilling tools may be employed to assist in the operation. To separate the pieces, the cemented shells are thrown into warm water, which softens the glue and separates the pieces.

Cast and sheet-iron and papier-maché are the materials upon which pearl is generally inlaid. The process is as follows: If the article be of cast-iron, it is well cleaned from the sand which usually adheres to the casting, and is blackened with a coat of varnish and lamp-black. When this is thoroughly dried, a coat of japan or black varnish is spread evenly upon it. Before the varnish becomes too dry, pieces of pearl cut in the form of leaves, roses, or such flowers as the fancy of the artist may dictate, or the character of the article may require, are laid upon it, and pressed down with the finger, and they immediately adhere to the varnished surface. The work is then placed in a heated oven and kept there for several hours, or until the varnish is perfectly dried. It is then taken from the oven and another coat of varnish applied indiscriminately on the surface of the pearl and the previous coating, and again placed in the oven till dry. This process is repeated several times. The varnish is then scraped off the pearl with a knife, and the surface of pearl and the varnish around it is found to be quite even. The pearl is then polished with a piece of pumice-stone and water, and the surface of the varnish is rubbed smooth with powdered pumice-stone, moistened with water.

It is in this unfinished state that the pearl has the appearance of being inlaid, and from which it derives its name. Its final beauty and finish depend altogether on the skill of the artist who now receives it.

The artist traces the stems and leaves of the flowers with a camel's-hair pencil, dipped in a size made of varnish and turpentine; upon this he lays gold leaf, which adheres where there is size, and the superfluous gold is carefully brushed off with a piece of silk. The flowers and leaves are then painted in colors, and when dry,

the picture and surface of the article is covered with a coat of refined white varnish. For inlaying, the thin pieces of pearl are cut by the artist into the required shapes by ordinary scissors, or by means of punches or dies worked by the foot of the operator.

A varnished surface can be ornamented by transferring drawings or engravings to it, and the process is quite simple. A thin coat of copal varnish is spread upon the surface of the article, and when nearly dry, the engraving is applied with its face downward and carefully pressed to exclude all air-bubbles. When the varnish is sufficiently dry, the paper is thoroughly moistened with a sponge dipped in warm water, and can be rubbed off, leaving all the lines of the print upon the varnished surface.

PENCILS, Black Lead.—The easiest way of producing, not only black lead, but all sorts of pencils, is by the following process, which at once combines simplicity, cheapness, and the finest quality:

Take white or pipe clay; put it into a tub of clean water, to soak for 12 hours, then agitate the whole, until it resembles milk, let it rest two or three minutes and pour off the supernatant milky liquor into a second vessel, allow it to settle, pour off the clear and dry the residue on a filter. Then add black lead, any quantity. Powder it and calcine it at a white heat in a loosely covered crucible, cool and carefully repulverize, then add prepared clay, prepared plumbago, equal parts. Water to mix. Make them into a paste and put it into oiled molds of the size required, dry very gradually, and apply sufficient heat to give the required degree of hardness; lastly, the pieces should be taken carefully from the molds and placed in the grooves of the cedar. The more clay and heat employed, the harder the crayon; less clay and heat of course produce a contrary effect. The shade of black may also be varied in the same way. Each mold must be made of four pieces of wood nicely fitted together.

PENCIL WRITING, To Fix.—Pencil writing may be fixed almost as indelibly as ink, by passing the moistened tongue over it. Even breathing slowly over the lines, after writing, renders them much less liable to erasure than when not subjected to that process. This fact may be of importance to persons who may wish to carry a memorandum book for a long time. In ordinary use the pages of such a book often become very much defaced by the erasure and diffusion of the pencil marks over the entire surface of the paper. A trial of the experiment will readily satisfy any person of the utility of the idea.

PENCILS, Indelible.—An agriculturist writes: In relation to indelible pencils for marking wood labels for garden and out door use, I will give my plan, which I think is a good one. I buy a genuine Faber No. 1, which usually costs ten cents; then I prepare my labels (cedar is the best material), and where I wish to write I rub on a little common linseed oil and write before it gets dry. I then have a writing that will remain indelible for many years, at a much less cost than a fifty cent pencil. If a little Japan varnish or dryer is added to the oil, it is better. A little white lead might be used in the oil, but it is not absolutely necessary. It is best to have a soft black pencil.

PERCUSSION CAPS, Printing Powder for.

—Take gunpowder, 40 parts. Reduce it to a fine powder, then mix it to a thin paste with water, next add chlorate of potass, 21 parts, previously reduced to a very fine powder. Make the paste rather thin, and deposit a small drop at the bottom of the cap. Care must be taken not to handle the mixture in quantity, when dry, lest it should explode.

PETROLEUM (Refined), To Decolorize.—Any of the Bleaching Agents known may be employed for this purpose; it is simply a question of dollars and cents and manipulation. Bleaching powder, the cheapest material, is to be stirred into the oil in sufficient quantity, which depends, of course, on the amount of color to be destroyed, and a little hydrochloric acid mixed with it afterwards. With occasional stirring the mixture is allowed to rest for twenty-four hours, when the clear liquid is drawn into another tank, washed with water until no longer acid, and distilled. This will yield a colorless, limpid oil.

PETROLEUM, Improved Method of Treating.—In London petroleum is used in the process of vulcanizing rubber. The petroleum serves simply as a solvent for chloride of sulphur. The commercial petroleum has for this purpose to be freed of all traces of water; for which purpose 10 per cent. of concentrated sulphuric acid is added, and the mixture actively and continually stirred. Then the acid, which now is very black, is allowed to settle, and the supernatant petroleum drawn off into a dry receiving vessel. To every barrel of petroleum one pound of quicklime is added, with some black oxide of manganese, and then the mass is distilled. Petroleum treated in this way is cheaper, and less injurious to the health of the laborer, than the bi-sulphide of carbon, which in some places is used for dissolving the chloride of sulphur and the rubber.

PICTURE FRAMES.—In the framing of prints or water-color drawings, with a margin between the subject and the frame, we have seen the most unsymmetrical widths taken by caprice both for margin and frame. You can frame prints with harmonic proportions by the following rule: 1. Find a harmonic third to the length and breadth of the print, and take it for the collective widths of the margin and frame. 2. Divide this space harmonically, so that the whole space, and the greater and smaller part of it, are three successive harmonic terms, and you have then taken the less part for the margin, and the greater part for the frame. A practical rule for dividing the collective width of the margin and frame into two harmonic parts is to multiply the whole width by the decimal .5858 and the product will be the width of the frame, and the rest the width of the margin, or vice versa. In case, however, one will insist on a very wide margin, he may take twice instead of once the harmonic third for the width of the margin and frame.

PICTURES for Magic Lanterns.—(New Style).—A sheet of gelatine, he says, such as is used for tracing, is securely fixed over an engraving, and with a sharp steel point (made by grinding down the end of a small round file) the lines of the original are traced pretty deeply on the transparent substance. Lead-pencil or crayon-dust is then lightly rubbed in with the finger, and the picture is at once ready for use. The effect of these drawings in the lantern is said to be excellent.

PIGMENTS for Stained Glass.—Red lead, 1 oz.; red enamel (Venetian glass enamel, from alum and copperas calcined together); grind them to a fine powder, and work this up with alcohol upon a hard stone. When slightly baked, this produces a fine flesh-color. No. 2. *Black color.*—Take 14½ oz. of smithy scales of iron; mix them with 2 oz. of white glass; antimony, 1 oz.; manganese, ½ oz.; pound and grind these ingredients together, with strong vinegar. No. 3. *Brown color.*—White glass or enamel, 1 oz.; good manganese, ½ oz.; grind together. No. 4. *Red, Rose, and Brown colors* are made from peroxide of iron, prepared by nitric acid. The flux consists of borax, sand, and minium, in small quantities. *Red color* may likewise be obtained from 1 oz. of red chalk, pounded, mixed with 2 oz. of white, hard enamel, and a little peroxide of copper. A *Red* may also be composed of rust of iron, glass of antimony, yellow glass of lead, such as is used by potters (or litharge), each in equal quantities; to which a little sulphuret of silver is added. This composition, well ground, produces a very fine red color on glass. No. 5. *Green.*—2 oz. of brass, calcined into an oxide; 2 oz. of minium, and 8 oz. of white sand; reduce them to a fine powder, which is to be inclosed in a well luted crucible, and heated strongly in an air furnace for an hour. When the mixture is cold, grind it in a brass mortar. Green may, however, be advantageously produced, by a yellow on one side, and a blue on the other. Oxide of chrome has been also employed to stain glass green. No. 6. *A fine Yellow stain.*—Take fine silver, laminated thin, dissolve in nitric acid, dilute with abundance of water, and precipitate with solution of sea-salt; mix this chloride of silver in a dry powder, with three times its weight of pipe-clay, well burnt and pounded. The back of the glass pane is to be painted with this powder; for, when painted on the face, it is apt to run into the other colors. A *pale yellow* can be made by mixing sulphuret of silver with glass of antimony and yellow ochre, previously calcined to a red-brown tint. Work all these powders together, and paint on the back of the glass. Or silver *laminae*, melted with sulphur, and glass of antimony, thrown into cold water, and afterwards ground to powder, afford a yellow. A *pale yellow* may be made with the powder resulting from brass, sulphur, and glass of antimony, calcined together in a crucible till they cease to smoke, and then mixed with a little burnt yellow ochre. The *fine yellow* of M. Meraud is prepared from chloride of silver, oxide of zinc, and rust of iron. This mixture, simply ground, is applied on the glass. *Orange color.* Take 1 part of silver-powder, as precipitated from the nitrate of that metal, by plates of copper, and washed; mix with 1 part of red ochre, and 1 of yellow, by careful trituration; grind into a thin pap, with oil of turpentine or lavender; apply this with a brush, and burn in.

PHOTO-LITHOGRAPHIC PROCESS, Improved.—In the first place, a solution is prepared of bichromate of potash (chemically pure), one part, water, twenty parts; and upon this a carbon tissue is allowed to swim for a couple of minutes. It is dried in an airtight box, containing fused chloride of calcium, within the space of twenty-four hours, and may be preserved many weeks without losing its sensitiveness.

The negative should be absolutely clear and

transparent in the lines, and otherwise as opaque as possible. The development is conducted, after brief exposure, with an ordinary iron developer, and the negative subsequently intensified with bichloride of mercury and sulphide of ammonium in the usual manner. The margin of the negative is covered with Indian ink, or with a paper mask fastened upon the reverse side of the plate. In this way the development of the picture is much improved, the pigment paper extending well beyond the unsolarized margin. The exposure varies from three quarters to one minute in the sun, and from four to ten minutes in diffused light.

For the development of the picture, an exceedingly smooth lithographic stone is employed, together with a sheet of fine filter paper, a squeegee, a dish of rain water, and a supply of hot water.

The print is first dipped into cold water, the air bubbles dissipated, and then placed face downwards on the stone. Without losing time, the filter paper is at once placed upon the tissue, and rubbed over well with the squeegee, a new supply of paper being subsequently applied in the same way, until the tissue is half dry. After waiting two or three minutes, the stone is put in a sloping position into a dish, and warm water allowed to flow over the whole surface; and under this treatment the unsolarized portions of the pigment paper begin to swell visibly under the paper in a very short time. The application of warm water is continued until the paper backing begins to leave the stone, and as soon as there is not much resistance to the operation one may proceed to draw it off. Upon the stone is seen a dark mass of gelatine, which disappears as the washing goes on, until a sharply defined image is the result. Upon the picture itself the water must never be poured, but only allowed to stream over the surface, as the lines are easily injured, and for this reason the warm water is applied from the edge of the stone.

When the image stands out clear and free, the stone is immersed in cold water until it has become cool, which necessitates an interval of some minutes. It is then leaned against a wall, and allowed to dry spontaneously, when lines which, in a moist state, were soft and hazy, become sharp and defined.

The dry picture is now covered with a solution of gum, as in the case of an ordinary lithographic impression, and, after drying, again moistened, and the lithographic ink repeatedly applied. The stone may then be rolled up and printed from in the ordinary press.

PLASTER, Adhesive.—Take of common, or litharge plaster, 5 parts, white resin, 1 part. Melt them together, and spread the liquid compound thin on strips of linen by means of a spatula or table knife. This plaster is very adhesive, and is used for keeping on other dressings, etc.

PLASTER of PARIS.—Plaster of Paris is composed of anhydrous (without water) sulphate of lime; it is chiefly used for taking models and casts, uniting slabs of marble and alabaster. It should be mixed with water to the consistence of thick cream, and then applied; it hardens rapidly. Plaster of Paris may be considerably strengthened by being mixed with thin glue, or a solution of size and gum instead of water. When mixed with iron filings to the proportion

of one-fifth the whole weight, plaster of Paris may be used in uniting iron.

PLASTER of PARIS, Working of.—When two to four per cent. of finely pulverized althea root (marsh mallow) is mixed with plaster of Paris, it retards the hardening, which begins only after an hour's time. When dry, it may be filed, cut, or turned, and thus becomes of use in making domino-stones, dies, brooches, snuff-boxes, etc. Eight per cent. retards the hardening for a longer time, but increases the tenacity of the mass. The latter may be rolled out on window glass into thin sheets, which never crack in drying, may be easily detached from the glass, and take on a polish readily by rubbing them. This material, if incorporated with mineral or other paints, and properly kneaded, gives very fine imitations of marble, and can be colored when dry, and can be made waterproof by polishing and varnishing. The chemist and chemical manufacturer will find it an excellent luting for vessels of every kind.

PLASTER CASTS, To Take.—The material employed is the "plaster of Paris" of commerce, which is bought and sold by the barrel, in the form of a white impalpable powder. When a quantity of this dry powder is rendered half fluid by thorough mixing with water until the whole mass is about the consistency of thick batter, the plastic material will become solid in a few minutes; and, in the course of a few hours, every part will be nearly as hard as white chalk. This peculiar quality of plaster of Paris, of solidifying so quickly after it has been mingled with water, enables artists to take impressions of forms, with admirable precision, which could not be taken in any other way. Previous to taking a cast, a mold must be made, having the exact form and shape of the original delicately impressed on the interior surface. Then the mold is filled with plaster in a semi-fluid state. After it has become hard, the mold is taken apart, and the cast removed.

If, for example, it is desired to take a plaster cast of a pear, the first step is to put about a pint of the dry plaster into a bowl, after having oiled the bowl with lard oil on the inside, to prevent the material from adhering to it. Water is then mixed with the plaster until it is so soft that it might be poured out. Now oil the surface of the pear thoroughly, and press the calyx end down into the plaster, until the largest part of the fruit is on a plane with the surface of the plaster. Hold the fruit quite still, until the plaster has become hard. Let it dry for a few minutes, and then gently lift the pear from its place. In case the plaster has been allowed to rise above the bulge of the fruit, the surface must be shaved away down to the largest diameter of the pear, before the latter can be extracted. Replace the pear, and dress the surface of the mold with a sharp knife to a perfect level; make four counter-sinks, half an inch deep, and as large as the end of a man's thumb, in the surface of the mold, while it remains in the bowl. Then oil the stem end of the fruit and the upper surface of the mold, and with a case-knife lay on a coat of plaster of Paris all around the fruit, until it is covered to the thickness of an inch. The stem of the fruit must be first removed, as it can not be drawn out of the mold. The plastic material must be applied gradually, as fast as it will solidify. Continue to lay on

the semi-fluid material until the outside has been brought up to the desired form, nearly square, and flat on the top. After this part of the mold has become hard, lift it carefully from the lower portion, and take out the pear. If the inside of the mold is not sufficiently smooth, let the rough places be dressed off, and the depressions filled with plaster. Then oil the interior surface with linseed oil, and allow it to dry. The mold is now ready for use. To take a cast from it, bind the two parts together, cut out a small hole on one side, say an inch in diameter, and fill the mold through this hole with the prepared plaster. After it has had sufficient time to become hard, take the mold apart, and remove the cast, which will appear, in every respect, like the original, except in color. A small hole may be bored for the stem, and a genuine stem may be inserted, and fastened with a little plaster; or an artificial stem may be made, and introduced to a sufficient depth to enable it to sustain the weight of the cast.

When a cast of a person's face, either alive or after death, is desired, let the hair and whiskers be modeled with potter's clay, brushed back smoothly, and oiled. Then prepare a quantity of plaster in a shallow dish, and lay the head back in it, to the desired depth, until it has become hard. After the plaster has set, dress off the edge of the mold and oil it. Now proceed to make another section of the mold over the face, by oiling the surface, and applying the plaster, as described above with reference to the cast of a pear. During the operation upon a living person, he must breathe through his nostrils. As soon as the material has hardened, lift it carefully, and remove the remaining section of the mold. Depressions must be counter-sunk always, in the edges of every section, to receive the dowel-points of the corresponding part of the mold. If the eyes are to be represented as open, depressions must be carved in the mold corresponding to the eyelids and brows. Now smooth and oil the inner surface of the mold with linseed oil; let it become dry; turn in plaster through the orifice left by the neck, roll the mold over and over, until every depression has been filled. After the material has become dry, remove the sections of the mold. If there be wrinkles or depressions with overhanging edges, which will hold the mold, they must be first filled, so that every section of the mold may be lifted off, without fracturing the corners. The depressions around and in the ears, for instance, must be first filled out, and smoothed off, before the mold is made. Otherwise the sections could not be lifted off. A beginner may exercise his skill in taking casts of a hand, or of any other simple object which will require a mold of only two parts.

PLASTER CASTS of Natural Objects, To Take.—The material of the mold is artists' modeling-wax, which is a composition akin to that used by dentists; and, as it becomes soft and plastic by the application of heat, though in a cold state it is perfectly rigid, it may be applied to the most delicate object without injury. As it takes the most minute markings and striations of the original to which it is applied, the microscopic structure of the surface of the original is faithfully reproduced in the cast. This method is briefly this: 1. Cover the object to be cast with a thin powder of steatite or French chalk, which

prevents the adhesion of the wax. 2. After the wax has become soft, either from immersion in warm water, or from exposure to the direct heat of the fire, apply it to the original, being careful to press it into the little cavities. Then carefully cut off the edges of the wax all round, if the undercutting of the object necessitates the mold being in two or more pieces, and let the wax cool with the object in it, until it is sufficiently hard to bear the repetition of the operation on the uncovered portion of the object. The steatite prevents the one piece of the mold sticking to the other. The original ought to be taken out of the mold before the latter becomes perfectly cold and rigid, as in that case it is very difficult to extract. 3. Then pour in plaster of Paris, after having wetted the moulds to prevent bubbles of air lurking in the small interstices; and, if the mold be in two pieces, it is generally convenient to fill them with plaster separately before putting them together. 4. Then dry the plaster casts either wholly or partially. 5. Paint the casts in water-colors, which must be fainter than those of the original, because the next process adds to their intensity. The delicate shades of color in the original will be marked in the cast by the different quantity of the same color, which is taken up by the different textures of the cast. 6. After drying the cast, steep it in hard paraffine. The ordinary paraffine candles, which can be obtained from any grocer, will serve the purpose. 7. Cool, and polish the cast by hand with steatite. The result of this process is said to be far better than that obtained by any other.

PLASTER CASTS, from Unburned Gypsum.

—This is simply to use in place of water a solution of potash or soda; or to mix the dry pulverized gypsum (sulphate of lime) with about an equal amount of sulphate of potash, and then add the water. As the relative quantities of gypsum, potash, or soda and water to be used depend greatly on the quality of the gypsum and alkalis, it is best to experiment in order to find what proportions will give the desired hardness.

PLASTER CASTS, To Give an Alabaster Effect to.—Plaster of Paris figures may be made to look like alabaster by dipping them in a strong solution of alum water.

PLASTER CASTS, To Harden.—Take two parts of stearine, two parts of Venetian soap, one part of pearlash, and twenty-four to thirty parts of a solution of caustic potash. The stearine and soap are cut into slices, mixed with the cold lye, and boiled for about half an hour, being constantly stirred. Whenever the mass rises, a little cold lye is added. The pearlash, previously moistened with a little rain water, is then added, and the whole boiled for a few minutes. The mass is then stirred until cold, when it is mixed with so much lye that it becomes perfectly liquid, and runs off the spoon without coagulating and contracting. Before using this composition, it should be kept for several days well covered. It may be preserved for years. Before applying it to the objects, they should be well dusted, the stains scraped away, and then coated, by means of a thick brush, with the wash, as long as the plaster of Paris absorbs it, and left to dry. The coating is then dusted with leather, or a soft brush. If the surface has not become shining, the operation must be repeated.

PLASTER CASTS, To Toughen.—A New England chemist says that he has succeeded in

making plaster casts so tough that they will bear the driving of a nail into them without cracking, by immersing them for a sufficient time in a hot solution of glue, to permit its permeating the entire mass.

PLASTER FIGURES, Amalgam for Varnishing.—Take tin, mercury, and bismuth, equal parts; fuse and cool, then make the amalgam into a varnish with white of egg.

PLUMB RULE, To Make.—Plane the face straight and out of wind. Plane one edge straight and square with the face. Run a gage mark to the proper width; plane to the mark exactly; gage to a thickness on each edge; plane to the marks. Run a gage mark through the center for the plumb or cord line. Saw a hole in the bottom for the bob. Cut a saw cut in the top of the line for the cord; and a slanting saw cut each side of the center one, to fasten the cord into. Geometrically it is correct to "strike a circle at each end, and to plane so as to touch the sides of the circle;" practically, it is next to impossible to touch the circle exactly and have the rule exactly straight between them.

PLUMBAGO, To Test.—The value of plumbago or graphite depends on its amount of carbon. In order to ascertain this, the latest, simplest, and best method is to dry the pulverized graphite at a temperature of some 350° Fahr., and then place it in a tube, four or five inches long and half an inch wide, made of hard glass, and closed at one end. To this is added about twenty times as much well-dried oxide of lead, and the whole is well mixed. The tube is then first weighed, and afterwards heated before the blow-pipe till the contents are completely fused and no longer evolve gases. After this operation, which does not last longer than ten minutes (if the quantity is not too large), the tube is allowed to cool, and its weight is then ascertained. The loss in weight is carbonic acid, the oxygen of which has been taken from the lead oxide; while the carbon is all that there was in the plumbago. For every twenty-eight parts of loss there must have been twelve of carbon. In general, it is sufficient to take from one to two grammes of plumbago and from twenty to forty of oxide of lead.

POLISH (French), For Boots, Shoes and Harness.—Take two pints of the best vinegar and one pint of soft water; stir into the mixture a quarter of a pound of glue broken fine, half a pound of logwood chips, a quarter of an ounce of finely-powdered indigo, a quarter of an ounce of the best soft soap, and a quarter of an ounce of isinglass. Boil for ten minutes or longer; then strain the liquid, bottle, and cork. When cold, it is fit for use.

Remove the dirt from the boots, etc., with a sponge and water. Then lay on the polish with a clean sponge. Should it prove too thick, hold it near the fire to warm a little, and the heat will liquefy it sufficiently.

POTTERY, Earth and Alkalies Used in.—*Terra di sienna*: deep brown or coffee color, fine, compact, very light, very smooth and glossy, does not color the hands; when wetted, marks a fine yellow upon paper; burns to a pale brownish red color, but does not harden; comes from Italy, and an inferior sort from Wycombe.

Burnt *terra di sienna* is used as a paint.

London blue clay: dark bluish; used for luting vessels in distilling acids, but requires

another luting over it to keep it moist and to prevent its cracking; it is also used for pottery, for lining ponds, and for modeling.

Devonshire blue clay is fat, tough, makes white solid pottery, but is expensive.

Devonshire black clay makes cream ware.

Devonshire cracking clay is gray, burns to a beautiful white, but is apt to crack in the firing. Common clay, used for artificial stones, as bricks, etc., and common pottery.

Fuller's earth is grayish brown, but varies greatly; hard, very compact, rough, but scraping glossy, does not color, burns hard and yellowish brown, being very fine, and absorbs grease very readily; used to full woollens.

Rotten stone is ash brown, very light, moderately hard, dry, coloring, burns to a deep ash color, but not harder; used as a color, and to give a polishing powder for metals; is to be found in Derbyshire.

Umber is fine, pale brown, close, very light, dry, coloring, burns deep reddish brown, but no harder; used as a color, and to give porcelain the shining ground called *écaille*; comes from Turkey.

Burnt umber is used for paint, makes a good shade for gold; both these umbers are excellent shades or dead colors, having a good body.

Windsor loam, Hedgerly loam, is yellowish brown, very hard, heavy, harsh, coloring slightly, burns very hard, and to a fine deep red; used for setting bricks of wind furnaces, glass-house furnaces, also for luting, and coating glass and earthen vessels to be exposed to a strong fire.

Bath bricks from Windsor loam made into bricks; used for a coarse polishing powder.

Founder's clay or penny earth is dusky brown, very hard, heavy, harsh, not coloring; found at Woolwich and in Northamptonshire; used for molds in large foundries.

Cheam clay is of light ash color, nearly white and very hard; used for the body of glazed gallipots.

Bohemian tripoli is of light ash color, heavy, moderately hard, open, harsh, dusty, but not coloring, not altered by burning; used for polishing and plate powder.

Terre verte is deep bluish green, very heavy, hard, smooth, glossy, not coloring, but marking a green line, taste coppery, burns very hard and to a dusky brown; found near Rome, also near Woolwich; used as a lasting, but not bright, green paint.

Argile de Saveigne is blue, very tough, sandy; used to make the French pottery *degrés* or stoneware.

Argile des Forges-les-eaux is blue; used to make glass-house pots and stoneware.

Welsh clay: used to make Welsh fire clumps for building fire rooms of steam engine furnaces.

French chalk is greenish, semi-transparent, compact, smooth, unctuous, glossy, not coloring, scrapes white, marks an unctuous silvery line, burns very hard and white; used to mark cloth, to take out grease, and cause boots to slip on easily; it is frequently confounded with Spanish chalk.

Myrsen meerscham is pale grayish green, resembling tallow dropped upon brass, close, heavy, smooth, unctuous, glossy, not coloring, burning extremely hard and pale white; used as soap, and to make the large German tobacco pipes, or rather the bowls of them.

White American bolus is bright, white, compact, very smooth and soft, not coloring, burns very hard, and at last forms a whitish glass.

Pearl white: light, smooth, not unctuous nor coloring; burns to a very pale yellowish white.

Tobacco-pipe clay: smooth, unctuous, slightly coloring, but is rather hard and very white; used principally to make tobacco pipes and white stonewares.

White lumber stone is used to take stains of grease out of woolen cloth.

Soap rock or Spanish chalk is white, firm, compact, weighty, hard, smooth, unctuous, not coloring; writes upon glass, and, if rubbed off, the marks become again visible by breathing upon the place, and, therefore, very useful in painting on glass, the engraving being afterwards hardened by fire, and, therefore, preferable for staining by fluoric acid.

Kaolin or porcelain clay is dry, friable, unfusible; that of Cornwall is used to make English china and fine pottery; that of Limoges, to make Sévres china, and is exported to most all countries of the globe. In earlier and the present times, similarly famous for their beautiful gilding and paintings, these articles are made in the manufactures of Meissen, and at Berlin and Passau, to make china for Saxony, Prussia, and Austria.

White chalk is white, soft, will mark linen when newly burned; it grows hot with water, and falls into powder, and is then made into crayons for painters.

Terra cimolia is white, compact, smooth, coloring, burning rather harder, found in the island Argentière; it is used to wash clothes.

Hard chalk is coarse.

Spanish white, *blanc d'espagne*, *blanc de troyes*, are made from soft chalks by washing and making into large balls for cheap white painting, and covering papers, cards, etc.

Prepared chalk is made by precipitation from a solution of muriate of lime, by a solution of sub-carbonate of soda in water, and washing the sediment.

Magnesia is white, and is obtained by precipitating the bitter or liquor left in the boiling of sea water, after the common salt has been separated, by a lye of wood ashes or sub-carbonate of potash.

Sub-carbonate of magnesia is made up while drying into large cubes, the edges beveled; is powdered by being rubbed through a sieve.

Gelatinous alumine, hydrate of alumine, or pure alumine, not dried, but in a moist state, is used to mix cobalt in an oxidized condition, and other oxides, as a basis for the color.

Baum's white of alum: Roman alum, one pound, honey, one half pound, calcined in a shallow dish to whiteness.

Blanc de Bouival or *gera* earth is silvery, silky, white, very fine and glossy if rolled with a glass roller; used to make enamel surfaces on paper or cardboard; is effervescent with acids, and used as well as fine whiting.

PORCELAIN OR CHINA, To Make.—Porcelain, or china, is a semi-vitrified earthenware of an intermediate nature between commonware and glass. Chinese porcelain is composed of two ingredients, one of which is hard-stone, called *petunse*, which is carefully ground to a very fine powder, and the other, called *kaolin*, is a white

earthy substance, which is intimately mixed with the ground stone.

Several compositions of mingled earth may yield a true porcelain by being burnt, and the porcelains of various countries differ in their mixtures. But the principal basis of any true porcelain is that kind of clay which becomes white by baking, and which, either by intermingled heterogeneous earth, or by particular additions, undergoes in the fire an incipient vitrification, in which the true nature of porcelain consists. Feldspar and gypsum, if added, may give that property to infusible clay.

When porcelain is to be made, the clay is properly selected, carefully washed from impurities, and again dried. It is then finely sifted, and most accurately mingled with quartz, ground very fine, to which then is added some burnt and finely pulverized gypsum. This mass is worked with water to a paste and duly kneaded; it is usually suffered to lie in this state for years. The vessels and other goods formed of this mass are first moderately burnt in earthen pots, to receive a certain degree of compactness and to be ready for glazing. The glazing consists of an easily-melted mixture of some species of earths, as the petrosilex or chert, fragments of porcelain and gypsum, which, when fused together, produce a crystalline or vitreous mass, which, after cooling, is very finely ground, and suspended in a sufficient quantity of water. Into this fluid the rough ware is dipped, by which the glazing matter is deposited uniformly on every part of its surface. After drying, each article is thoroughly baked or burned in the violent heat of the porcelain furnace. It is usual to decorate porcelain by paintings, for which purpose enamels or pastes, colored by metallic oxides, are used, so easy of fusion as to run in a heat less intense than that in which the glazing of the ware melts.

PORCELAIN (English), To Make.—The iron-stone, which contains a portion of argil and silice, is first roasted in a common biscuit-kiln, to facilitate its trituration, and to expel sulphur and other volatile ingredients which it may contain. A large earthen crucible is constructed after the exact model of an iron forge, a part of the bottom of which is filled with charcoal or cokes; these having been previously strewed with ore and about $\frac{1}{2}$ part of lime, are raised to an intense heat by a strong blast of air, introduced under the cokes at the bottom. By this heat the ore is fused, and the fluid iron drops through the fuel to the bottom; then follows the scoria, which floats upon the top of the fluid iron. This latter scoria, or, as the workmen call it, slag, is the material used in the manufacture of china, and is much impregnated with iron, and of a compact and dense structure. The slag is next let off, by a hole through the forge, into a clean earthen vessel, where it cools. This last vessel is then broken, in order to detach the slag from it, with hammers. The scoria is next pounded into small pieces and ground in water to the consistence of a fine paste, at the flint-mills of the country. This paste is then evaporated to dryness on a slip-kiln, well known amongst potters. Thus evaporated to dryness, it is used with the other ingredients in the following proportions, viz.:

Prepared iron-stone, 3 cwt.; ground flint, 4 cwt.; ground Cornwall stone, 4 cwt.; Cornwall clay, 4 cwt.; blue oxide of cobalt, 1 lb.

These having been mixed together with water by the slip-maker, are again evaporated on the slip-kiln to the proper consistency for use. The clay, thus prepared, is of course used in the usual manner in the fabrication of the several kinds of vessels.

POTASSIUM, Sulphocyanide of.—Mix together 46 parts of anhydrous ferrocyanide of potassium, 17 parts of carbonate of potassa, and 32 parts of sulphur; introduce the mixture into an iron pan provided with a lid, and fuse at a gentle heat; maintain the same temperature until the swelling of the mass which ensues at first has completely subsided and given place to a state of tranquil and clear fusion; increase the temperature now, towards the end of the operation to dull redness, in order to decompose the hyposulphite of potassa which has been formed in this process. Remove the half refrigerated and still soft mass from the pan, pulverize it, and boil with alcohol. Let the alcoholic solution cool, when part of the sulphocyanide of potassium will separate in colorless crystals; to obtain the remainder, distill the alcohol from the mother liquor. Dissolve 1 part of the salt in 10 parts of water for use.

PRINTS and PRINTED BOOKS, To Bleach.—Simple immersion in chlorine gas, letting the article remain in it a longer or shorter space of time, according to the strength of the liquor, will be sufficient to whiten an engraving. If it is required to whiten the paper of a bound book, as it is necessary that all the leaves should be acted on by the gas, care must be taken to open the book well, and to make the boards rest on the edge of the vessel, in such a manner that the paper alone shall be dipped in the gas. The leaves must be separated from each other, in order that they may be equally acted on on both sides. Chlorine water, freshly made, will answer instead of the gas.

PRINTED SHEETS, To Clean.—A method recommended by a foreign contemporary for cleaning printed matter and engravings consists in fastening the sheet to a board by broad-headed tacks, and washing it with clean water, to which a slight percentage of carbonate of ammonia has been added. This process must be conducted very carefully with a soft brush. The paper is then to be rinsed off with water, and the operation repeated on the back side as soon as it is dried. It is then to be moistened with water acidulated with pure wine vinegar, and again washed with water, to which a little chloride of lime has been added. Finally, it is washed off again and dried in the air by sunlight. In this way it becomes extremely white without any injury to the impression. Some valuable engravings have, it is said, been completely restored by this method.

PRINTING ROLLERS.—These are made of treacle and glue, with sometimes a little Paris white, etc. The proportions are about $\frac{1}{2}$ lb. of glue to $1\frac{1}{4}$ lb. of treacle; the glue is broken to pieces, soaked for 24 hours in sufficient water, then melted with the treacle, and cast into a mold previously oiled. On removing the composition it forms a cylinder without a seam, elastic, like India rubber, yet sufficiently soft to ink the type without injuring them. When it gets hard, which happens in 2 to 4 months, according to the weather, etc., it is necessary to re-melt it, adding a little more treacle. Used to ink the

type for letter press. If the composition is too hard, the ink does not spread evenly; if too soft, pieces are torn away from the roller. When the printing is finished, the roller is rubbed over a sink stone with cold water, which dissolves a little of the external coat, and so leaves it clear of ink.

PUMP (Nautical), Self-Acting.—Captain Leslie, in a voyage from North America to Stockholm, adopted an excellent mode of emptying water from his ship's hold, when the crew were insufficient to perform that duty. About ten or twelve feet above the pump he rigged out a spar, one end of which projected overboard, while the other was fastened as a lever to the machinery of the pump. To the end which projected overboard was suspended a water-butt, half full, but corked down, so that when the coming wave raised the butt-end, the other end depressed the piston of the pump; but at the retiring of the wave, this was reversed, for, by the weight of the butt, the piston came up again, and with it the water. Thus, without the aid of the crew, the ship's hold was cleared of the water in a few hours.

A very useful hint may be taken from this plan; when a vessel has much water, and there are not hands enough to work the pumps, one pump might be arranged on this plan, and the other fully manned in the usual way.

QUEENSWARE, To Make.—This is made of the same materials as the flintware, but the proportion in which the materials are mixed is not the same, nor is the ware glazed in the same way. The flintware is generally made of four measures of liquid flint, and 18 of liquid clay; the yellow ware has a greater proportion of clay in it. In some manufactories they mix 20, and in others 24 measures of clay with 4 of flint. The proportion for both sorts of ware depends very much upon the nature of the clay, which is very variable even in the same pit. Hence a previous trial must be made of the quality of the clay, by burning a kiln of the ware. If there be too much flint mixed with the clay, the ware, when exposed to the air after burning, is apt to crack, and if there be too little, the ware will not receive the proper glaze from the circulation of the salt vapor.

QUILLS, German Method of Preparing.—Suspend the quills in a copper over water, sufficiently high to touch the nibs; then close it steam-tight, and apply four hours' hard boiling; next withdraw and dry them, and in 24 hours cut the nibs and draw out the pith; lastly, rub them with a piece of cloth and expose them to a moderate heat. The quills prepared in this way are as hard as bone, without being brittle, and as transparent as glass.

RAG CARPETS.—These indispensable articles of the house are made and highly prized, in nearly all families in the country. The suggestions of the experienced may lessen the labor of making them to the inexperienced, besides making a better looking carpet.

First, the rags or old garments ought to be washed clean; then rip them to pieces, rejecting the parts too worn to be used; if not ready to color them, tie in bundles all that are to be colored each color, and any that do not need coloring may be cut and sewed, or tied up by themselves, if not ready to commence the work. All woolen ones ought to be

kept in linen sacks, to exclude the moths from them.

Any light, mixed, or plaided woolens may be improved in color by dipping in a good red dye. Clean white rags can be colored yellow, orange, blue, or green. Dingy white rags will look well, colored hemlock color and set with lime. This is a cheap, pretty and durable color for some of the rags and the warp. Bits of bark may be gathered around saw mills, when one cannot get it elsewhere; boil enough bark to make a strong dye, and add to it a little clear lime water, after removing all bits of bark or straining the dye. If dregs remain in any dye, it will spot the cloth or yarn.

If a smooth parlor carpet is wanted, the rags must be cotton, and other rags that are made of fine yarn. Coarse-threaded woolen rags make a carpet look rough, and though it may do well enough for a kitchen, it is not so nice for a parlor.

Unless the rags are light, it will take a pound and a half, and sometimes more, for each yard of carpet. To know when sufficient rags are prepared for the number of yards wanted, the prepared rags must be weighed. If the rags are light, it will not take quite a pound and a half; but if they are coarse-threaded or woolen rags, it will take some more than a pound and a half, if the carpet is well beaten up.

If a striped carpet is wanted, tear each color separately, and mix together the different shades of the same color when sewing; this will make the carpet more uniform in color and prettier than if some stripes contained all the brightest colors, and others paler ones, which they will, if the shades of the same color are not mixed in sewing. A carpet always looks much better if all the breadths are uniform in color, and by mixing the shades of the same color in sewing them it will be so.

For a hap-hazard carpet, all different colors may be mixed in sewing. This will use up all short rags, of any color or shade, and often makes a very pretty carpet, which may be woven easier and cheaper than a striped carpet. Short pieces, or those not more than three or four yards long, alternated with shorter ones, look the best in this kind of carpet.

For warp, good strong prepared yarn is the best, and saves much labor. It may be reeled into skeins of five knots before coloring, allowing one skein to a yard, and about three knots over to be woven in at the end of each breadth, for binding.

Measure the inside of the room, and let the weaver know how long to make each breadth. Carpets will shrink a little in length from the weaver's measure after they come out of the loom, but will often stretch a little in width. The stripes will match the best, if the edges on the same side of the loom are sewed together, as the different sides of the loom sometimes vary a little.

RAILROAD SIGNALS.—The varieties of the "toot" of the locomotive, and gyrations of the arms of the conductors by day, or lanterns by night, are about as intelligent to most people as first-class Choctaw. The following will give the reader a correct idea of their signification:

One whistle—"Down brakes."

Two whistles—"Off brakes."

Three whistles—"Back up."

Continuous whistles—"Danger."

A rapid succession of short whistles is the cattle alarm, at which the brakes will always be put down.

A sweeping parting of hands on level of eyes, is a signal to "go ahead."

A downward motion of the hand, with extended arms, "to stop."

A beckoning motion of one hand, "to back."

A lantern raised and lowered vertically, is a signal for "starting;" swung at right angles or crossways the track, "to stop;" swung in a circle, "to back the train."

A red flag waved upon the track must be regarded as a signal of danger. So of other signals given with energy.

Hoisted at a station is a signal for a train "to stop."

Stuck up by the roadside, it is a signal of danger on the train ahead.

Carried unfurled upon an engine, is a warning that another engine or train is on its way.

RAZOR, To Hone and Strop.—Let the hone be seldom and but sparingly resorted to, and never, unless by frequent and repeated stropping the edge of the razor is entirely destroyed; use the best oil, and be careful to preserve the hone clean and free from dust. Previously to the operation of shaving, it will be found of service, particularly to those who have a strong beard and a tender skin, to wash the face well with soap and water, and the more time is spent in lathering and moistening the beard, the easier will the process of shaving become. Dip the razor in hot water before applying it to the face; use the blade nearly flat, always taking care to give it a cutting instead of a scraping direction. Strop the razor immediately after using it, for the purpose of effectually removing any moisture that may remain upon the edge, and be careful not to employ a common strop, as the composition with which they are covered is invariably of a very inferior quality, and injurious to a razor. The strop should always be of the best manufacture, and when the composition is worn off it will be found particularly useful to rub it over, lightly, with a little clean tallow, and then put upon it the top part of the snuff of a candle, which being a fine powder, will admirably supply the place of the best composition ever used for the purpose. Another excellent mode of renovating a razor-strop is by rubbing it well with pewter, and impregnating the leather with the finest metallic particles.

RAZOR-STROP PASTE.—1. Levigated oxide of tin (prepared putty powder) 1 oz.; powdered oxalic acid $\frac{1}{4}$ oz.; powdered gum 20 grs.; make it into a stiff paste with water, and evenly and thinly spread it over the strop. With very little friction this paste gives a fine edge to the razor, and its efficiency is still further increased by moistening it.—2. Emery reduced to an impalpable powder 2 parts; spermaceti ointment 1 part; mix together, and rub it over the strop.—3. Jewelers' rouge, black lead, and suet, equal parts; mix.

RAZOR PAPER.—This article supersedes the use of the ordinary strop; by merely wiping the razor on the paper, to remove the lather after shaving, a keen edge is always maintained without further trouble; only one caution is necessary—that is, to begin with a sharp razor, and then "the paper" will keep it in that state for years. It may be prepared thus: First,

procure oxide of iron (by the addition of carbonate of soda to a solution of persulphate of iron), well wash the precipitate, and finally leave it of the consistency of cream. Secondly, procure a good paper, soft and thin, then with a soft brush spread over the paper (on one side only) very thinly the moist oxide of iron—dry, and cut into two inch square pieces. It is then fit for use.

RAZOR STROP, To Renovate.—1. Rub a little clean tallow over the surface, and then put on it the light top part of the snuff of a candle; rub it smooth. Excellent.—2. Rub the strop well with a piece of soft pewter or lead.

REFRIGERATOR, Home Made.—See "Ice Chest."

RELATIVE HEIGHT and WEIGHT.—The late Dr. John Hutchinson, after obtaining the height and weight of over five thousand persons, prepared the following tabular statement, showing the relative height and weight of persons in health:

5 feet 1 inch,	120 pounds.
5 feet 2 inches,	125 pounds.
5 feet 3 inches,	133 pounds.
5 feet 4 inches,	139 pounds.
5 feet 5 inches,	142 pounds.
5 feet 6 inches,	145 pounds.
5 feet 7 inches,	148 pounds.
5 feet 8 inches,	155 pounds.
5 feet 9 inches,	162 pounds.
5 feet 10 inches,	169 pounds.
5 feet 11 inches,	174 pounds.
6 feet,	178 pounds.

The above is the average; of course there are many cases of variation.

RHEUMATISM (Inflammatory), Pumpkins for.—At a recent meeting of the New York Farmers' Club, a correspondent wrote of the virtues of the pumpkin, giving the following instance of its value for inflammatory rheumatism: A woman's arm was swelled to an enormous size and painfully inflamed. A poultice was made of stewed pumpkins, which was renewed every fifteen minutes, and in a short time produced a perfect cure. The fever drawn out by the poultices made them extremely offensive, as they were taken off. I knew a man cured of severe inflammation of the bowels by the same kind of application.

RHEUMATISM in HORSES, To Cure.—Crude coal oil, 1 pint; strong vinegar, $\frac{1}{2}$ pint; turpentine, $\frac{1}{2}$ pint, mixed, and well shaken. To be rubbed on mornings and nights.

RHUBARB, Compound Tincture of.—Take of rhubarb, sliced, 2 ounces; liquorice root, bruised, $\frac{1}{2}$ ounce; ginger, powdered, saffron, each 2 drachms; distilled water, 1 pint; proof spirits of wine, 12 ounces by measure. Digest for 14 days, and strain. Dose, $\frac{1}{2}$ ounce as an aperient, or 1 ounce in violent diarrhoea.

RHUBARB, Sweet Tincture of.—Take of rhubarb, bruised, 2 ounces; liquorice root, bruised, 2 ounces; aniseed, bruised, 1 ounce; sugar, 1 ounce; diluted alcohol, 2 pints. Macerate for fourteen days, express and filter.

ROADS, Repairing.—This is an operation which is or should be performed immediately after the settling of the ground in the spring. In agricultural districts it is often deferred till later in the season. In this case the labor of putting a road in good condition is often doubled. It is as true of roads as of raiment that "a stitch in time saves nine," and if for the word stitch

we substitute ditch, the old saw will be even more forcible in its meaning.

Winter makes sad havoc in the earth roads which intersect the country in all directions. His frosts upheave, and the springs wash out deep gulleys and ruts, and when at last the reign of frost is over, that which was straight is all crooked; level places are changed into alternate rises and depressions, stones are left on the top, and, in short, these roads become sloughs of despond in which loaded teams wallow in despair, and where wagons are left standing for weeks up to the hubs in mud, simply because it is beyond the power of horse flesh to extricate them.

If, when the mud has dried, the ruts were filled at once, and the ditches at the wayside opened, much would be gained, but as this is generally neglected, the June thunderstorms have things all their own way. Sluices are filled, bridges undermined and washed away, and, finally, when the "road master" summons the inhabitants to turn out and work on the road, they find plenty to do. The road is at last put into passable condition, and remains so till the fall rains and the marketing wagons again cut them all up, and the snow following hides them from view till the ensuing spring.

An old farmer once remarked to us that there is no other work done by farmers that pays so well as road making; but there are few of them that are far sighted enough to see that the saving effected by good roads in the current expenses of repairs in wagons and harnesses, and the increase of loads which can be carried, pay liberally for the work, which they do grudgingly, when at last it is performed.

ROCK BLASTING.—Sawdust of soft wood, mixed with gunpowder in equal parts, is said to have thrice the strength of gunpowder alone, when used in blasting.

ROCKWORK, Artificial Coral for.—Take four parts of yellow resin and one part of vermilion, and melt them together; dip twigs, cinders or stones in this mixture, and it will give them the appearance of coral; and is applicable to rockwork, grotto, or any fancy work, as a substitute for that costly article.

ROPES, Rules for Computing the Strength of.—To find what size rope you require, when roven as a tackle, to lift a given weight. Divide the weight to be raised by the number of parts at the movable block, to obtain the strain on a single part; add one third of this for the increased strain brought by friction, and reeve the rope of corresponding strength.

One sixth of 40 tons is $6\frac{2}{3}$ tons, which, with one third added, is 9 tons nearly, for which you should reeve a six inch or six and a half inch rope.

Conversely:—To find what weight a given rope will lift when roven as a tackle: Multiply the weight that the rope is capable of suspending by the number of parts at the movable block, and subtract one fourth of this for resistance.

Thus: 8.9 tons, the strength of the rope, multiplied by 6, the number of parts at the movable block, minus 13.3 or one fourth, gives 40.1 tons as the weight required.

Wire rope is more than twice the strength of hemp rope of the same circumference; splicing a rope is supposed to weaken it one eighth.

The strongest description of hemp rope is untarred, white, three stranded rope; and the next in the scale of strength is the common three strand, hawser laid rope, tarred.

ROPE, To Make Flexible.—New, stiff rope may be made flexible by simply boiling it two hours in water, and then hanging it in a warm room to dry thoroughly.

ROOFS, Fireproof Wash for.—Slake lime in a close box to prevent the escape of steam, and when slaked pass it through a sieve. To every six quarts of this lime add one quart of rock salt and one gallon of water. After this boil and skim clean. To every five gallons of this add, by slow degrees, three quarters of a pound of potash and four quarts of fine sand. Coloring matter may be added if desired. Apply with a paint or whitewash brush. This wash looks as well as paint and is almost as durable as slate. It will stop small leaks in a roof, prevent the moss from growing over it, and render it incombustible from sparks falling on it. When applied to brick work, it renders the brick utterly impervious to rain; it endures as long as paint, and the expense is a mere trifle.

ROOFS, Moss on.—Don't let the moss gather on the roofs of your buildings. It may be ornamental to some eyes, but not very beneficial to the shingles. They will rot fast enough by the moisture it retains; so sprinkle some fine lime upon them just before a rain, and you will be surprised to see how clean it will be taken off.

RUBBER HOSE, To Mend.—Cut the hose apart where it is defective; obtain, from any gas-fitter, a piece of iron pipe two or three inches long; twist the hose over it until the ends meet, wrap with strong twine, well waxed, and it will last a long time.

SALT of LEMONS.—Take of cream of tartar, 2 ounces; salt of sorrel (quadraxalate of potassa), 4 ounces. Reduce both to fine powder and mix. To remove fruit stains and such like from linen, by rubbing a little of it on the part, moistened with warm water.

SANDAL WOOD, Spirit of.—Take of oil of sandal wood 1 oz.; alcohol 2 oz.; oil of cinnamon 25 minims. Mix. Dose one or two drachms three times a day.

SANDPAPER (Superior), To Make.—Take a quantity of broken window glass, (that which has rather a green appearance on the edge is best); pound it in an iron mortar; then have two or three sieves, of different degrees of fineness, ready for use when wanted. Take any good tough paper, (fine cartridge is the best,) level the knobs and lumps on both sides with pumice-stone, tack it at each corner on a board, and, with good clear glue, diluted with about one third more water than is used generally for wood-work, go quickly over the paper, taking care to spread it even with your brush; then, having your sieve ready, sift the pounded glass over it lightly, yet so as to cover it in every part; let it remain till the glue is set, take it from the board, shake off the superfluous glass into the sieve, and hang it in the shade to dry. In two or three days, it will be fit for use.

The paper will be much better than any you can buy, sand being frequently mixed with the glass and colored to deceive the purchaser.

SCREWS and NUTS, To Loosen.—When you find screws and nuts have become fast from rust, pour on them a little kerosene or coal oil, and

wait a few moments till they become soaked with the liquid. When this is done, they can be easily started, and the bolt saved.

SEED, Quantity Required for a Given Number of Hills, or Length of Drill.—Asparagus, 1 oz. to 60 ft. drill; beet, 1 oz. to 50 ft. drill; carrot, 1 oz. to 180 ft. drill; endive, 1 oz. to 150 ft. drill; onion, 1 oz. to 100 ft. drill; parsley, 1 oz. to 150 ft. drill; parsnip, 1 oz. to 200 ft. drill; radish, 1 oz. to 100 ft. drill; spinach, 1 oz. to 100 ft. drill; turnip, 1 oz. to 150 ft. drill; peas, 1 qt. to 100 ft. drill; dwarf beans, 1 qt. to 150 hills; corn, 1 qt. to 200 hills; cucumber, 1 oz. to 50 hills; watermelon, 1 oz. to 30 hills; muskmelon, 1 oz. to 60 hills; pumpkin, 1 oz. to 40 hills; early squash, 1 oz. to 50 hills; marrow squash, 1 oz. to 16 hills; cabbage, 1 oz. to 3000 plants; cauliflower, 1 oz. to 3000 plants; celery, 1 oz. to 4000 plants; egg plant, 1 oz. to 2000 plants; lettuce, 1 oz. to 4000 plants; pepper, 1 oz. to 2000 plants; tomato, 1 oz. to 2000 plants.

SEED, Quantity Required for the Acre, and Actual Weight of Each to the Bushel.—

	To the acre.	Lbs. to bush.
Wheat, broadcast.....bushels.....	1½ to 2	60
" drilled....."	1½	60
Rye, broadcast....."	1½	56
" drilled....."	1½	56
Oats, broadcast....."	3	33
Timothy, ".....gallons.....	3	45
Red Clover, broadcast....."	3	4
White Clover, ".....pounds.....	8	50
Lucerne, broadcast....."	10	54
Herd or Red Top, broadcast.....bushels.....	1	1½
Blue Grass, broadcast....."	1	1½
Millet, "....."	¾	45
Hungarian, "....."	¾	50
Corn in hills.....gallons.....	1	1½
Turnip and Ruta-baga.....pounds.....	1	50
Onion Sets....."	1	28

SEWING MACHINES, Hints on Using.

—It is a fact known to all who use sewing machines that the prevailing difficulty is the breaking of the thread. Nearly all other disarrangements that occur, can usually be overcome by any person of ordinary ingenuity; even though they have had but a few weeks, or perhaps, days experience in the use of a sewing machine.

This breaking, which is mostly with the upper thread, may occur from an imperfect adjustment of the tension. With new machines this is invariably the cause; but with those that have been in use several months, the breaking (when the tension is right) is produced by the threads wearing into the guides, so that when a swelled place in the thread reaches the narrow groove which is worn to the exact width of the regular size of the thread, not being allowed to pass through, the thread breaks.

Of course this break may take place anywhere from the point of the needle back to the grooved guide which caught it. As it is usually at or near the end of the needle, the real cause is very generally overlooked. Many have been so troubled with this continual breaking that it has been necessary for them to lay aside their machines, when if this cause had been known to them, by simply smoothing the guide holes with a small round file, their trouble would have ended.

SHAMPOO LIQUID.—The simplest shampooing liquid is the best—and this is made by dropping borax, lump or powdered—into water until no more borax will dissolve. There is no danger of its getting too strong. This being applied to the hair makes a very good lather;

wash out with clean water, and when the hair has dried—if harsh, use a very little oil or sweet oil and cologne water mixed. A more elaborate wash or shampooing liquid is used by barbers. It is as follows: carbonate of ammonia $\frac{1}{4}$ oz., carbonate of potash 1 oz., water 1 pint. Dissolve. Then add tincture of cantharides 5 fluid ounces, best alcohol 1 pint, rum three quarts, shake up well and let it stand a week before using; make a good lather and stimulate the skin; healthy skinned persons should not use it—their skin does not want stimulating—they only want cleansing.

SHAVING LIQUID.—1. White soap, 3 ounces; proof spirit, 8 ounces; distilled water, 4 ounces; carbonate of potash, 1 drachm; scented with essence of lemon. Dissolve the soap without heat, and add the potash and essence.—2. White soft soap, 16 ounces; oil of olives, $\frac{1}{2}$ oz.; gum benzoin, 1 drachm; rectified spirit, 24 oz.; digest. Rub a few drops on the beard, followed by warm water.

SHAVING PASTE.—Melt together one drachm each of spermaceti, white wax, and almond oil; beat it up with 2 ounces of the best white soap, and add a little lavender or cologne water.

SKATING, Hints on.—This delightful art affords the most appropriate outdoor exercise and amusement that can well be conceived for a winter day; like some other practical arts, however—swimming, for example—no amount of mere theoretical instruction will enable a person who knows nothing about it, so much as to stand with skates on upon the ice, much less to glide along its surface with the ease and grace of a skillful performer. What is required is really very simple, and is entirely of a practical kind. See that your skates are neither too large nor too small, that they fit your boot so tightly as to be immovable, and that the blades are sharp. Put them on and endeavor to stand on them on the ice. It is wonderful how speedily, and, as it were, instinctively, you will acquire the power of balancing yourself, and moving on the slippery surface. A fall or two may be unavoidable, but, like some of the evils of human life, they will be but a temporary inconvenience, bringing with them greater security as experience increases.

We have no intention of presenting our readers with an elaborate essay on the art of skating, but shall confine ourselves to a few useful hints. Without any minute descriptions of the instrument, a remark or two as to the "iron" or blade on which the skater stands may be made. Sometimes it is made plane at the bottom, and sometimes it is fluted. In our opinion the plane surface is the better form. The height of this "iron" ought to be an inch at the back and three-fourths of an inch in front, and the curve in the front should not project too far, but merely so as to clear the toe well. As already hinted, the skate ought to fit tightly and accurately, and to this end it ought to be furnished with a screw, to be screwed into the heel of the boot; these will go far to render the skate perfectly steady when properly strapped to the boot.

Presuming the skate securely fixed, and the boot also tightly laced, the learner's first attempt must be to place himself in a perpendicular attitude on the ice. It may be said that his first step is to stand. The back of a chair placed before him, a stick shod with an iron spike, or the

friendly hand of an experienced acquaintance, will be found in this primary effort of great use. When some tolerable degree of steadiness is acquired, some attempt at locomotion may be made, and in so adventurous an effort, especially if made by any of our fair readers, a vigorous arm to lean upon on each side, will be found a great comfort, till some degree of confidence is acquired, and will act the part which cork floats or bladders do toward the timid swimmer who suddenly finds himself "out of his depth."

If the learner intend to begin with his right foot, he ought to keep the left knee straight and firm, bending it only a little at the instant of striking out, and *vice versa* so acting with the left foot and right knee. The body ought to be slightly inclined forwards, of course, so as—in scientific language—to "keep the centre of gravity over the base," the learner taking advantage of the friendly support on each side as he strikes out, and if such support is unattainable, making the best use he can of his stick, and submitting with his best grace to the inevitable necessity of a sudden obedience to the law of gravitation in the shape of a fall. The skater ought never to look at his feet, nor at the ice near him, as by doing so, he is very apt to increase the number of his exploits in the way of tumbling, for it is unquestionable that he can keep his balance better by looking straight forwards than by fixing his attention on the movement of his feet; this, however, he will soon find by experience. It is remarkable that this rule is exemplified in intellectual and moral affairs; we are more likely to attain a successful result by giving our attention rather to the ultimate object in view, although it be remote, than by confining our prospect to each minute and, perhaps, difficult step which leads to it. The learner, while keeping his head up, ought to advance his body a little forwards. By this means he will avoid a backward fall, which is often a serious mischance. The learner's face ought always to be turned in the direction to be followed. All movements in skating ought to be smooth and graceful, and quite free from jerking and awkward gestures. The act of stopping is performed by slightly bending the knees, bringing the heels together and bearing upon them; it may also be accomplished by turning short to the right or left.

It is only requisite further to add that the method of skating in certain figures is not difficult to acquire when proficiency in the art is attained; to furnish learners with precepts for those performances on the ice, which imply a large amount of experience, is hardly requisite, for the art of moving over the ice in figures is itself learnt in the act of learning to skate.

SIZING for BOOTS and SHOES in Treating out.—Take water 1 qt., and dissolve in it, by heat, isinglass 1 oz.; adding more water to make up for evaporation; when dissolved, add starch 6 oz.; extract of logwood, beeswax, and tallow, of each 2 oz.; and continue the heat until all is melted and well mixed. Rub the starch up first, by pouring on sufficient boiling water for that purpose.

SILK, Gilding on.—Silks, satins, woollens, ivory, bone, etc., may be readily gilded by immersing them in a solution of nitro-muriate (terchloride) of gold, (1 of the salt to 3 or 4 of water,) and then exposing them to the action of hydrogen gas. The latter part of the process

may readily be performed by pouring some diluted sulphuric acid on zinc or iron filings, in a bottle, and placing it under a jar or similar vessel, inverted, at the top of which the articles to be gilded are to be suspended.

The foregoing experiment may be very prettily and advantageously varied as follows:—Paint flowers or other ornaments with a very fine camel-hair pencil, dipped in the above mentioned solution of gold, on pieces of silk, satin, etc., and hold them over a Florence flask, from which hydrogen gas is evolved, during the decomposition of the water by sulphuric acid and iron filings. The painted flowers, etc., in a few minutes will shine with all the splendor of the purest gold. A coating of this kind will not tarnish on exposure to the air, or in washing.

SILK (Varnished), To Prepare.—Varnished silk, for making umbrellas, capots, coverings for hats, etc., is prepared in the same manner as the varnished and polished cloths already described, but with some variation in the liquid paste or varnish. If the surface of the silk be pretty large, it is made fast to a wooden frame furnished with hooks and movable pegs, such as that used in the manufacture of common varnished cloths. A soft paste, composed of linseed-oil boiled with a fourth part of litharge; tobacco-pipe clay, dried and sifted through a silk sieve, 16 parts; litharge, ground on porphyry with water, dried and sifted in the same manner, 3 parts, and lampblack, 1 part. This paste is then spread in a uniform manner over the surface of the silk by means of a long knife, having a handle at each extremity. In summer, 24 hours are sufficient for its desiccation. When dry, the knots produced by the inequalities of the silk are smoothed with pumice-stone. This operation is performed with water, and, when finished, the surface of the silk is washed. It is then suffered to dry, and fat copal varnish is applied. If it be intended to polish this varnish, apply a second stratum, after which polish it with a ball of cloth and very fine tripoli. The varnished silk thus made is very black, exceedingly pliable, and has a fine polish. It may be rumpled a thousand ways without retaining any fold, or even the mark of one. It is light, and therefore proper for coverings to hats, and for making cloaks and caps so useful to travelers in wet weather.

SIGNATURES, To take Fac-similes of.—Write your name on a piece of paper, and while the ink is wet sprinkle over it some finely-powdered gum arabic, then make a rim round it and pour on it some fusible alloy, in a liquid state. Impressions may be taken from the plates formed in this way, by means of printing-ink and the copperplate-press.

SHIPS, To Ventilate.—Air-pipes are used for drawing foul air out of ships, or other close places, by means of fire. One extremity is placed in a hole in the side of a furnace, (closed in every part excepting the outlet for the smoke;) the other in the place which it is designed to purify. The rarefaction produced by the fire causes a current of air to be determined to it, and the only means by which the air can arrive at the fire being through the pipe, a quick circulation, in the place where the extremity of the pipe may be situated, is consequently produced.

SHELLAC, To Bleach.—The bleaching of

shellac is generally effected on a large scale by chlorine or some of its compounds, or by sulphuric acid; the bleached article costs more than twice as much as the unbleached. The bleached shellac is frequently dissolved in spirits of wine for use as a varnish by cabinet makers. This varnish is apt to stain any inlaid metallic ornament upon the furniture, or any metal attached to it, in consequence of the varnish retaining a small proportion of the bleaching compound in solution. Another process of bleaching may be adopted which renders the varnish free from this objection, and very much reduces the cost of the bleached shellac or seed lac. This process consists in the use of animal charcoal as a bleaching powder. It is prepared in the following manner:—Any quantity of yellow shellac, previously broken in small pieces, is conveyed into a flask, alcohol of 0.83 sp. gr. poured upon it, and the whole heated on the hob, or, in the summer, in the sun, until the shellac is dissolved; upon this so much coarsely powdered animal charcoal is added to the solution that the whole forms a thin paste; the flask is closed, not quite air tight, and left so for some time, exposed to the sun; and in eight to fourteen days a small sample is filtered, sufficient to ascertain whether it has acquired a light yellowish brown color, and whether it yields a clear, pure polish on light colored woods. If this be the case, it is filtered through coarse blotting paper, for which purpose it is best to employ a tin funnel with double sides, similar to those employed in filtering spirituous solutions of soaps, opodeldoc, etc. The portion which first passes through the filter may be preserved separately, and used as a ground or first polish. Then some more spirit is poured over the charcoal upon the filter, and the solution used as a last coating. The solution of shellac purified by animal charcoal has a brown yellow color, but it is perfectly clear and transparent; when diluted with alcohol, the color is so slight that it may be used in this state for polishing perfectly white wood, such as maple, pine, etc., without the wood acquiring the least tint of yellow.

SLATES, Artificial.—Elastic slates have come to be almost an article of necessity on account of being light, and as easily carried in the pocket as a memorandum book, having the advantage over the other kind in the fact that the notes and writing can be easily effaced, leaving the surface clean and ready for further use. The following is the composition from which they are made: Sand in very fine powder, 82 parts; lampblack, 8 parts; boiled linseed or cottonseed oil, 10 parts. This mixture is to be thoroughly mixed together and spirits of turpentine added in order that the kind of paint thus obtained may be applied on a thin sheet of pasteboard. As soon as the first coat is dry another coat is applied, and even a third application is sometimes required. The last coat is smoothed by being rubbed with a piece of cotton waste, saturated with spirits of turpentine.

The artificial slates thus obtained are light, easily transported, not liable to be broken, and a slate pencil is used to write upon them.

SMALL-POX, Darkness in Treating.—It is stated that if a patient, in the beginning of the attack, be put in a room from which absolutely all light is excluded save that of a candle, the effect is to arrest the disease in the papular or

vesicular stage; it never becomes purulent, and the skin between the vesicles is never inflamed or swollen; the liquor sanguinis is prevented from becoming pus; the large scabs of matter never form over the face; there is no intense pain, and only trifling itching, and the smell is either very slight or altogether wanting.

SOAP-BUBBLES, Large and Long-Lasting.—For the production of unusually large soap-bubbles that will last for hours, and exhibit splendidly the beautiful colors of the rainbow, a fluid may be employed that can easily be prepared in the following way: Fine shavings of palm-oil soap are shaken in a large bottle with distilled water, until a concentrated solution of the soap is obtained; this is filtered through gray filtering paper, and mixed then with about one-third of pure glycerine. The fluid is to be shaken up before use. By means of a small glass funnel, of two inches diameter, connected with a tube of India rubber, soap-bubbles may be prepared with this fluid that will vie in the beauty of the display of color with the rainbow itself, and which may be kept for a long while by putting them carefully upon an iron ring which is slightly rusty and thoroughly wet with the soap solution. Bubbles of one foot and more in diameter will keep from five to ten minutes; those of two to three inches in diameter, for hours—often for ten to twelve.

SOUP TABLETS, Prussian.—Take eleven parts by weight of good suet, melt it in an iron pan, and make it very hot, so as to become brown; add, while keeping the fat stirred, eighteen parts of rye meal, and continue heating and stirring so as to make the mass brown; add then four parts of dried salt and two parts of coarsely pulverized caraway seed. The mixture is then poured into tin pans somewhat like those used for making chocolate into cakes. The cakes have the appearance of chocolate, and are chiefly intended for the use of soldiers while in the field. A quantity of about one ounce of this preparation is sufficient to yield, when boiled with some water, a ration of good soup, and in case of need the cakes, being agreeable to the taste, may be eaten raw.

SPONGE PAPER.—For the fabrication of an article called sponge paper, lately patented in France, evenly and finely divided sponge is added to ordinary paper pulp, and this is worked as in the common paper making apparatus, into sheets of different thicknesses. It is said to have all the peculiarities of sponge, absorbing water readily, and remaining moist a long time. It has been used as dressing for wounds with considerable advantage and is capable of several important technical applications.

STAMMERING, To Cure.—No stammering person ever found any difficulty in singing. The reason of this is that by observing the measure of the music—by keeping time—the organs of speech are kept in such position that enunciation is easy. Apply the same rule to reading or speech, and the same result will follow. Let the stammerer take a sentence, say this one—'Leander swam the Hellespont'—and pronounce it by syllables, scan it, keeping time with his finger if necessary, letting each syllable occupy the same time, thus, Le—an—der—swam—the—Hel—les—pont, and he will not stammer. Let him pronounce slowly at first, then faster, but still keeping time, keeping time with

words instead of syllables, and he will be surprised to find that, by very little practice, he will read without stammering, and nearly as rapidly as persons ordinarily talk or read. Then practice this in reading and conversation until the habit is broken up. Perseverance and attention is all that is necessary to perform a perfect cure.

STARCH from Frosted Potatoes.—Potatoes much frosted will make very good starch, though it is a shade darker in color. All coarse clothes requiring to be stiffened, where whiteness is no object, may be done with starch made from potatoes greatly penetrated with frost. The best method of making potatoes into starch is to grate them down into water, then to take out all the refuse with the hand, and next to strain the whole of the water in which the potatoes have been grated through a thin cloth, rather coarse, or fine sieve, and afterwards frequently putting on and pouring off water until it comes clear from the starch, which is always allowed to settle or fall to the bottom of the vessel in which the operation is performed. An experiment was tried with a few potatoes that were put out to frost. They were grated down and made into starch powder. The produce of the fresh potato weighed 876 grains, while that of the frosted was only 412, being less than half the quantity.

The refuse of the potato, when taken from the sieve, possesses the property of cleansing woolen cloths without hurting their colors, and the water decanted from the starch powder is excellent for cleansing silks without the smallest injury to their color. In making hair-powder it has long been used, and is therefore well known.

STEAM-ENGINES, To Take Care of when Newly-set.—After a newly-set steam-boiler has been fitted out with all the requisite parts, it is to be filled with water one or two inches above the normal level. There being no pressure of steam, the fact that the boiler is filled to the desired height, can only be ascertained by blowing air through the open gauge-cocks. From the bubbling of the air, ascending through the water, it is easily ascertained whether there is sufficient water or not. The float on the glass gauge indicates the water-level directly, but the former is often less accurate on account of the coldness of the stuffing-box. If the man-hole is still open, the level may more readily be ascertained by means of a rod. The charging generally takes place by means of an efficient hand-pump, since the cases are exceptional where there is a higher situated reservoir, from which the boiler may be fed. This convenience is only met with where steam-engines are situated near water-wheels, (whether for the increase of force, or for the substitution of water-power during repairs, etc.,) or where there is an upper pond, or the establishments are near a steep mountain, abounding in rivulets; or in iron-works, which, for the hoisting of the furnace-charges, require high reservoirs and hydraulic lifts. In order to fill the boiler, a canvas hose is attached to the discharging-mouth of a hand-pump or to the conduction-pipes, and introduced into the man-hole. If there are several boilers for only one machine, and in case one of them has been cleaned as reserve boiler, which it is desired shall now be rapidly filled, it is necessary to fasten a mouthpiece to the delivery-pipe of the cold pump, so that a hose can be attached. It is less expensive to use

hose than solid pipes; they are more simple and less easily damaged. After being used, they must be well dried, and not kept in moist places. In many establishments, as in cotton-mills, iron-works, and calico printing-works, the pumps are so constructed that they can also be employed as fire-engines.

After the charging of the boiler, the fire is made, for which purpose brushwood and shavings are best. The fire is regulated by means of a damper or the fire-door, in such a manner that during the first day the temperature of the water will not attain the boiling-point. It is advisable to keep the door open, since the drying of the masonry will be accelerated by the current of entering air. But, as the drying proceeds, the opening must be more and more closed, and finally it ought to be kept shut, except during the poking of the fire.

If the walling is very moist, steam-clouds are seen issuing from the chimney. The author of this was once compelled to put up a boiler in very cold weather, and with frozen stones. Yet, by constructing proper flues in the brick-work, and by firing with care, steam could be produced on the evening of the second day. The brick-work was dry, without having been injured in the least.

On the second day the fire was increased, the door was kept nearly closed, the damper open a little more. With new boilers and chimneys, it often happens that at first there is no draught, especially where it is carried long distances around the boiler. This is explained by the fact that the hot air meets too great a resistance from the dense, cold air in the draught-holes and chimney. This evil can be remedied by kindling a straw fire at the foot of the chimney. In setting a new boiler, the cleaning-hole of the chimney should, therefore, be left open. But if once the walling is warmed through, the firing may be interrupted for several days, and even for a longer time, without any appreciable evil effects, since bricks retain their heat for a long while. As soon as the least current is created, the fire at once becomes active, the flame attains direction, and having once reached the chimney, its activity is still more increased.

Although the greatest attention must be paid to the firing, all the parts connected with the generation of steam ought not on that account to be neglected. It is, for instance, well to examine whether the float plays well after the box has become hot, and the engineer should satisfy himself of the right position and the reliability of its movements. If the beam on the side of the float-stone is pressed down, the latter should immediately sink into the water; but if relieved by the pressure, it should be lifted by the counter-weight into the position corresponding to the existent water-level. The points to which most attention must be paid are the steel edges upon which the beam turns, and the stuffing-box. The edges ought not to be pressed too much into the nut of the lever. When steam is generating, the efficiency and mobility of the gauge-cocks are to be tried. In high-pressure boilers, the cock of the manometer must be opened, while in low-pressure boilers, the air-valve is to be inspected. The safety-valves must also be examined, opened, and lifted from their seats and turned, in order to prevent their sticking by the adhesion of the oil. The author has seen valves thus stuck

suddenly thrown up by the steam, causing derangements and fractures. The valves with a directly applied weight play less readily; if one corresponds, for instance, to a pressure of four atmospheres, by waiting until the steam has reached a tension of two or three atmospheres, it may easily be lifted.

Moreover, in low-pressure boilers, inspection should be made of the induction-pipe before the tension has attained the desired height; the fireman must examine whether the float is movable, and whether the feeding-pipe is in order; he must inspect the manometer, withdrawing the float from the mercury, and letting it slide again into it. It will now be seen where there are untight joints and screws. Although the former may have been drawn on very tight, they generally get loose again by getting warm, so that they have to be screwed on anew. If the leaks are so great that they can not be done away with in this manner, and by driving in small wooden wedges which have been put in putty, the spots must be well marked, so that the evil may be remedied at the first stand-still. Steam should be turned on slowly; for if allowed to pass suddenly into the pipes, the thereby condensing water has a tendency to open the joints, the water often running from them.

The fire must be regulated according to the generation of steam, the tension of which, dependent on the speed of the machine, is indicated by the manometer. To use as little fuel as possible is here the first principle. Whether wood, peat, coal, coke, or brown coal are to be burned should be decided upon beforehand, so that the boiler as well as the walling may be constructed accordingly. It remains then only to decide upon the different varieties of these combustibles, as with regard to hard coal between baking coal, open and close burning coal and anthracite. In order to try a kind of fuel, it ought to be used for at least four or six days; other kinds must be employed for the same quantity of steam under like conditions, (cleaned flues, etc.) When different kinds of fuel admit of being used together, the mixtures should be tried in various proportions. From the mechanical effect produced, it may at once be determined which kind of fuel is best adapted for permanent use.

When several sorts of hard coals are to be had, those mixtures are to be tried, which in most cases range cheaper than the pure coals. In running a steam-engine of twenty-two horsepower, we have daily saved one thaler, (nearly 70 cents gold,) when, instead of using either baking or cherry coal alone, we burned a mixture of equal parts of each.

STONE, Artificial.—White.—Alum, 1 lb.; water, 1 gal. Dissolve, then steep in this liquor calcined gypsum, $\frac{3}{4}$ cwt. Next dry for eight days in the open air, and calcine at a dull, red heat; grind and sift and form into a paste with water; when hard apply a thin layer of the above paste over the surface with a brush; when quite hard, polish with pumice, etc., in the usual way.
—**Cream Color.**—Alum, 1 pound; copperas, $\frac{1}{2}$ pound; water, 9 pints. Dissolve, and proceed as before.

STONE FACADES, To Clean.—It has been ascertained that the jet of water thrown from a steam fire-engine has the power of removing the discoloration produced by the smoke,

without injuring the face of the stone. The work is done from the ground, the force of the stream thrown by the steam fire-engine being sufficient to effect the necessary cleansing.

STONEWARE (English), To Manufacture.—Tobacco-pipe clay from Dorsetshire is beaten much in water; by this process the finer parts of the clay remain suspended in the water, while the coarser sand and other impurities fall to the bottom. The thick liquid, consisting of water and the finer parts of clay, is further purified by passing it through hair and lawn sieves of different degrees of fineness. After this the liquor is mixed (in various proportions for various ware) with another liquid of the same density, and consisting of flints calcined, ground and suspended in water. The mixture is then dried in a kiln, and being afterwards beaten to a proper temper, it becomes fit for being formed at the wheel into dishes, plates, bowls, etc. When this ware is to be put into the furnace to be baked, the several pieces of it are placed in the cases made of clay, called seggars, which are piled one upon another, in the dome of the furnace; a fire is then lighted, when the ware is brought to a proper temper, which happens in about 48 hours, it is glazed by common salt. The salt is thrown into the furnace through holes in the upper part of it, by the heat of which it is instantly converted into a thick vapor, which, circulating through the furnace, enters the seggar through holes made in its side (the top being covered to prevent the salt from falling on the ware), and attaching itself to the surface of the ware, it forms that vitreous coat upon the surface which is called its glaze.

SUGAR REFINING.—A German paper mentions a new process of refining sugar in which the saccharine juice, after being clarified in the usual way by means of lime and carbonic acid, is precipitated at boiling temperature with caustic baryta (60 parts of the latter for every 100 of sugar), the precipitate suspended in water and decomposed with carbonic acid. A pure solution of sugar is obtained, which only requires to be evaporated.

STOVES, To Mend Cracks in.—Take equal parts of wood ashes and common salt, and mix them to a proper consistence with water; with this fill the cracks.

STOVES, To Keep from Rust.—Kerosene applied with a cloth to stoves will keep them from rusting during the summer. It is also an excellent material to apply to all iron utensils used about a farm.

SULPHUR, Flexible.—By adding to pure sulphur a four hundredth part of chlorine or iodine it becomes very soft, so that it may be spread in thin leaves as flexible as leaves of wax.

SULPHUROUS ACID, To Make.—To 12 oz. of sulphuric acid, in a glass retort, add 2 oz. of sulphur and apply a gentle heat. This is a cheap and easy process.

SULPHURETED HYDROGEN.—Pour dilute sulphuric acid on sulphuret of iron. This is made by applying a roll of sulphur to a bar of iron heated white hot, or by heating in a crucible a mixture of 2 parts, by weight, of iron filings and 1 of flowers of sulphur.

SWIMMING, Art of.—It has been observed that men are drowned by raising their arms above water, the unbuoyed weight of which depresses the head; all other animals have neither

motion nor ability to act in a similar manner, and therefore swim naturally. When a man therefore falls into deep water, he will rise to the surface and continue there if he does not elevate his hands. If he move his hands under the water in any manner he pleases his head will rise so high as to allow him liberty to breathe, and if he move his legs as in the act of walking (or rather of walking upstairs), his shoulders will rise above the water, so that he may use less exertion with his hands, or apply them to other purposes. These plain directions are recommended to the attention of those who have not learned to swim in their youth, and they will, if attended to, be found highly advantageous in preserving life.

If a person falls into the water or gets out of his depth and cannot swim, and if he wishes to drown himself, let him kick and splash as violently as possible, and he will soon sink. On the contrary, if impressed with the idea that he is lighter than the water, he avoids all violent action and calmly but steadily strives to refrain from drawing his breath while under the water, and keeps his head raised as much as possible, and gently but constantly moves his hands and feet in a proper direction, there will be a great probability of his keeping afloat until some aid arrives.

SYRUP of the Phosphate of Iron.—Take of phosphate of iron 96 grs.; water 9 fl. drs.; syrupy phosphoric acid (Sp. gr. 1.5) 7 fl. drs.; syrup 10 fl. oz. Rub the phosphate of iron with the water in a glass mortar, add the phosphoric acid, and filter the mixture into the syrup.

SYRUP of Phosphate of Iron and Lime.—Take of phosphate of iron 96 grs.; phosphate of lime 192 grs.; water 8 fl. drs.; syrupy phosphoric acid 8 fl. drs.; syrup 10 fl. oz. Mix the powders with the water in a glass mortar, add the acid, and filter into the syrup. Each fluid drachm contains 1 grain iron, 2 gr. lime, and equivalent to 30 minims dilute phosphoric acid.

The phosphate of lime is made by precipitation from solutions of chloride of calcium and phosphate of soda, dried at 100° F., and used whilst fresh. That made from bone-ash is much less soluble.

SYRUP of Phosphate of Iron and Quinine.—Take of phosphate of iron 192 grs.; phosphate of quinia 96 grs.; water 7 fl. drs.; syrupy phosphoric acid 9 fl. drs.; syrup 10 fl. oz. Rub the powders with water, add the acid, and filter into syrup. Each fluid drachm contains 2 gr. iron and 1 gr. quinine.

SYRUP of Phosphate of Manganese.—Take of phosphate of manganese 96 grs.; water 9 fl. drs.; syrupy phosphoric acid 7 fl. drs.; syrup 10 fl. oz. To be made as last. Strength, 1 gr. manganese salt and 25 minims of acid to fluid drachm.

TANNING in VACUO.—This invention consists in an improved mode of operation by means of an oscillating rack in an air tight tanning box having a pump for withdrawing the air, a vat for supplying the liquid on the top by opening a valve, and a liquid distributing apparatus inside. The box is also provided with openings, closed air tight by glass, for watching the progress, and a vacuum gauge for indicating the vacuum.

The air being pumped out of the box opens

the pores of the skins, whereby they are prepared to be most thoroughly saturated with the liquid, which, being let in upon the hides in this condition in a distributed way, is, together with the agitation of the hides in the liquid by the oscillating frame, calculated to greatly accelerate the work. This the inventor claims to have demonstrated by practical tests, in which sheep skins were completely tanned in six hours; calf skins in twenty-four hours; cow hides in thirty-six, and ox hides in sixty hours. Moreover, the quick saturation of the hides with the liquid, is claimed to make the leather more even in quality inside and out. The quality is also improved; for the fibers on the outside are not damaged by the too great action of the tanning liquid, as in the old and slow process, in which it is necessary to expose the outside too long in order that the liquid may penetrate to the interior.

TAR, Syrup of.—Tar (strained) 1 ounce (troy); pulverized sugar (refined) 12 ounces (troy); carbonate of magnesia 3 ounces (troy); rubbed to powder on a sieve. Alcohol 2 fl. ounces; water a sufficient quantity. Mix the alcohol with six fl. ounces of water, rub the tar in a mortar of sufficient capacity with one ounce of the sugar, and then with the carbonate of magnesia, gradually added, until the whole is reduced to a uniform, pulverulent mixture. To this gradually add with constant trituration, which should be continued for fifteen or twenty minutes, four fl. ounces of the mixture of alcohol and water; then strain with strong expression. Return the residue to the mortar, and again triturate, first with one ounce of the sugar, and then with the remaining four fl. ounces of the mixture of alcohol and water, gradually added, as before; finally strain and strongly express, and then reduce the dregs by trituration to a smooth and uniform condition, and pack firmly in a glass funnel prepared for percolation, and adjusted to the neck of a graduated bottle containing the remainder of the sugar, and pour upon this the expressed liquid; and when it has all disappeared from the surface, continue the percolation with water until the whole measures one pint. Agitate occasionally, until the sugar is dissolved, and strain if necessary. Dose from a dessert to a tablespoonful.

The strained tar, such as is usually sold in gallon cans, answers well for this purpose, but when it is not at hand the crude tar may be dissolved in a small quantity of ether and strained, and the ether allowed to evaporate spontaneously.

TEST PAPER, New.—Professor Böttger announces the discovery of a new re-agent, which, he asserts, is highly sensitive to the alkalis. It is a coloring extract of the *coleus vershaeffelti*, and is produced by digestion, for 24 hours, in pure alcohol, to which a few drops of sulphuric acid have been added. The hue is a brilliant red, which turns green on contact with any alkali. It is not affected by carbonic acid, and will detect the slightest trace of ammonia in illuminating gas, if moistened and placed against an open jet. The presence of the minutest quantity of a carbonate of any of the alkalis is detected by it.

TEETH, Cements for.—1. Mix 12 parts of dry phosphoric acid with 13 parts of pure and pulverized quicklime. It becomes moist in mixing, in which state it is introduced into the cavity of the tooth, where it quickly becomes hard.—2. Digest 9 parts of powdered mastic

with 4 parts of ether, and add enough powdered alum to form a stiff paste.—3. Gutta-percha, softened by heat, is recommended. Dr. Rollis advises melting a piece of caoutchouc at the end of a wire, and introducing it while warm.—4. (*Metallic.*)—Amalgams for the teeth are made with gold or silver, and quicksilver, the excess of the latter being squeezed out, and the stiff amalgam used warm. Inferior kinds are made with quicksilver and tin, or zinc. A popular nostrum of this kind consists of 40 grains of quicksilver and 20 of fine zinc filings, mixed at the time of using. The following is said to be the most lasting and least objectionable amalgam: Melt 2 parts of tin with 1 of cadmium, run it into an ingot, and reduce it to filings. Form these into a fluid amalgam with mercury, and squeeze out the excess of mercury through leather. Work up the solid residue in the hand, and press it into the tooth. Another cement consists of about 73 parts of silver, 21 of tin, and 6 of zinc, amalgamated with quicksilver.

TOBACCO, To Flavor.—This is done by means of a mixture of one part each of lemon peel, orange peel, figs, coriander seed, and sassafras; one half part each of elderflowers, elderberries, and cinnamon; two parts of saltpeter, three of salt, and four of sugar. This mixture must be digested in fifty parts of water, and, before applying it, flavored with an alcoholic solution of gum benzoës, mastic, and myrrh. It is said that this decoction gives a flavor to common leaves resembling closely the Porto Rico; but to this end the leaves must be well dried, about a year old, well permeated with the preparation, kept in a pile for eight days, turned daily, and finally dried.

TORTOISE SHELL, To Imitate.—In order to do this well, your foundation or ground work must be perfectly smooth and white, or nearly so; you then gild it with silver leaf with slow size, so as to have it perfectly smooth, with no ragged edges, cleaning the loose leaf off. Then grind Cologne earth very fine, and mix it with gum water and common size; and with this, having added more gum water than it was ground with, spot or cloud the ground work, having a fine shell to imitate; and when this is done, you will perceive several reds, lighter and darker, appear on the edges of the black, and many times lie in streaks on the transparent part of the shell. To imitate this finely, grind *sanguis draconis* with gum water, and with a fine pencil draw those warm reds, flushing it in about the dark places more thickly; but fainter and fainter and thinner, with less color towards the lighter parts, so sweetening it that it may in a manner lose the red, being sunk in the silver or more transparent parts. When it is dry, give it a coat of varnish, let it stand a few days, then rub it down with pumice stone and water. Then grind gamboge very fine, and mix with varnish, giving of this as many coats as will cause the silver to have a golden color, then finish with a clean coat of varnish.

TOYS, Varnish for.—Copal, 7 parts; mastic, 1 part; Venice turpentine, $\frac{1}{2}$ part; strongest alcohol, 11 parts. Dissolve the copal first, with the aid of a little camphor, then add the mastic, etc., and thin with alcohol as required.

TRACINGS, To Photograph without a Camera.—Lay out several thicknesses of cloth, on a smooth drawing board, on top of which place a

sheet of sensitized paper, superimpose the same with the drawing, right side up, and press the whole down perfectly smooth with a piece of glass which is to be kept in place by clothes pins and weights, and expose it under the skylight until the edges of the paper show a sufficiently dark impression, when it is to be removed, toned, and fixed. In this manner an exact copy of a drawing can be made, the only difference, as a matter of course, will be, the lines will be white and the body of the paper dark, which is of no disadvantage whatever.

TREES, Average Growth of.—Three or four years ago the Illinois Horticultural Society appointed a committee to prepare a report on the cultivation and growth of forest trees. The committee concluded an able report by saying: As the results of our observations and from the testimony of reliable men, we regard the following as about the average growth in twelve years, of the leading desirable varieties, when planted in belts or groves and cultivated as directed:—White Maple, 1 foot in diameter and 30 feet high. Ash-leaf Maple, 1 foot in diameter and 20 feet high. White Willow, 1½ feet in diameter and 40 feet high. Yellow Willow, 1½ feet in diameter and 35 feet high. Lombardy Poplar, 10 inches in diameter and 40 feet high. Blue and White Ash, 10 inches in diameter and 20 feet high. Chestnut, 10 inches in diameter and 20 feet high. Black Walnut and Butternut, 10 inches in diameter and 20 feet high. Elm, 10 inches in diameter and 20 feet high. Birch, (varieties), 10 inches in diameter and 25 feet high. Larch, 8 inches in diameter and 24 feet high. As before intimated, the different varieties of evergreens will make an average growth of eighteen to twenty inches in height annually.

From these and other data which the intelligent farmer can collect, he may readily approximate estimate of the cost of fence posts, rails, fire-wood, hewing timber, lumber, etc.

TUBA ROOT.—The roots of a plant known in Borneo by the name tuba or tooba are much valued in that country for destroying vermin on plants and animals. They are thrown into water and allowed to stand a short time, after which the animals or plants are washed with the water. It is said that the infusion is very deadly to the vermin, but innocuous to the plant and animals. The roots are used whilst fresh, and are believed to lose their properties in drying. They are also used constantly for poisoning fish and pools. The plant is one of the Leguminosæ.

URINE, Incontinence of.—The continued use of tincture of iodine (one to six drops a day) is said to be a permanent cure.

VARNISH, Green.—There is a most beautiful transparent green varnish employed to give a fine glittering color to gilt or other decorated works. As the preparation of this varnish is very little known, an account of it may in all probability prove of interest to many of our readers. The process is as follows: Grind a small quantity of a peculiar pigment, called "Chinese blue," along with about double the quantity of finely powdered chromate of potash, and a sufficient quantity of copal varnish thinned with turpentine. The mixture requires the most elaborate grinding or incorporating of its ingredients, otherwise it will not be transparent, and therefore useless for the purpose for which it is intended. The "tone" of the color may be vari-

ed by an alteration in the proportion of the ingredients; a preponderance of chromate of potash causes a yellowish shade in the green, as might have been expected, and *vice versa* with the blue under the same circumstances. This colored varnish will produce a very striking effect in japanned goods, paper-hangings, etc., and can be made at a very cheap rate.

VARNISHING of Paper.—Colored designs would be more simply and satisfactorily varnished by first giving a coat of good gum-arabic and then of varnish of about equal parts of turpentine and Canada balsam. Colors mixed with gum may be used over Indian ink, even on tracing-cloth, without smearing. I may add that for maps or lithographs I found that good white starch (two coats or more) answered better, at less cost than the common isinglass recommended in receipt-books, followed by the above varnish. A lithographed picture well done with thick varnish looks almost as if glazed, or, in other cases (with borders cut off), like an oil-painting.

VARNISH for Prints, etc.—This is made by eight parts of gelatine glue being mixed with one part alum, and half part Marseilles soap, in boiling water. The glue being first well dissolved, the alum and soap are added; all is then well boiled, and afterwards strained and filtered. This varnish will protect the objects from damp, and is perfectly water-proof.

VARNISH for Violins, etc.—Rectified spirits of wine, ½ gal.; add 6 oz. gum sandarac, 3 oz. gum mastic, and ½ pt. turpentine-varnish; put the above in a tin can by the stove, frequently shaking till well dissolved; strain, and keep for use. If you find it harder than you wish, thin with more turpentine-varnish.

VARNISH for Shoes.—It is a bad plan to grease the upper leather of shoes for the purpose of keeping them soft; it rots the leather, and admits dampness more readily. It is better to make a varnish thus: Put half a pound of gum shellac broken up in small pieces, in a quart bottle or jug; cover it with alcohol, cork it tight, and put it on a shelf in a warm place; shake it well several times a day, then add a piece of gum camphor as large as a hen's egg; shake it well, and in a few hours shake it again, and add one ounce of lamp-black; if the alcohol is good, it will be dissolved in three days; then shake and use. If it gets too thick, add alcohol—pour out two or three teaspoonfuls in a saucer, and apply it with a small paint brush. If the materials are all good, it will dry in about five minutes, and will be removed only by wearing it off, giving a gloss almost equal to patent leather. The advantage of this preparation above others is, it does not strike into the leather and make it hard, but remains on the surface, and yet excludes the water almost perfectly. This same preparation is admirable for harness, and this does not soil when touched, as lamp-black proportions do.

VARNISHING WALNUT FURNITURE.—In dressing over old furniture, the first thing to be done is to wash it over with lime or soda water, to remove all effects of grease from sweaty hands which will prevent varnish from flowing freely or hardening well. If the work requires refilling, rye flour, wheat flour, corn starch, or Paris white, ground fine in oil and turpentine, will do; but one or two coats of shellac should

be laid on and rubbed smooth before applying the varnish. Work finished in oil, without varnish, should be filled with a harder substance than starch. Some use white wax reduced in turpentine; but what is better is a compound of equal parts, by weight, of whiting, plaster of Paris, pumice-stone, and litharge, to which may be added a little French yellow, asphaltum, vandyke brown, and *terra di sienna*. Mix with one part japan, two of boiled oil, and four of turpentine. Grind fine in a mill. Lay the filling on with a brush, rub it in well, let it set twenty minutes, then rub off clean. Let it harden two or three days, then rub smooth, and, if required, repeat the process. When the filling is satisfactory, finish with linseed oil, put on with a brush; wipe off, and rub to a polish with fine cotton; finish with a silk handkerchief, or any fine fabric.

VENEERING.—The softest woods should be chosen for veneering upon—such as common cedar or yellow pine; perhaps the best of all for the purpose is "arrow board," twelve foot lengths of which can be had of perfectly straight grain, and without a knot; of course no one ever veneers over a knot. Hard wood can be veneered, boxwood with ivory, for instance; but wood that will warp and twist, such as nasty cross grained mahogany, must be avoided.

The veneer, and the wood on which it is to be laid, must both be carefully prepared, the former by taking out all marks of the saw on both sides with a fine toothing plane, the latter with a coarser toothing plane. If the veneer happens to be broken in doing this, it may be repaired at once with a bit of stiff paper glued upon it on the upper side. The veneer should be cut rather larger than the surface to be covered; if much twisted, it may be damped and placed under a board and weight over night. This saves much trouble; but veneers are so cheap, about 1d. a foot, that it is not worth while taking much trouble about refractory pieces. The wood to be veneered must now be sized with thin glue; the ordinary glue pot will supply this by dipping the brush first into the glue, then into the boiling water in the outer vessel. The size must be allowed to dry before the veneer is laid.

We will suppose now that the veneering process is about to commence. The glue in good condition, and boiling hot, the bench cleared, a basin of hot water with the veneering hammer and a sponge in it, a cloth or two, and everything in such position that one will not interfere with, or be in the way of another.

First, damp with hot water that side of the veneer which is not to be glued, then glue the other side. Second, glue over as quick as possible the wood itself, previously toothed and sized. Third, bring the veneer rapidly to it, pressing it down with the outspread hands, and taking care that the edges of the veneer overlap a little all round. Fourth, grasp the veneering hammer close to the pane (shaking off the hot water from it) and the handle pointing away from you; wriggle it about, pressing down stoutly, and squeezing the glue from the center out at the edges. If it is a large piece of stuff which is to be veneered, the assistance of a hot flat iron from the kitchen will be wanted to make the glue liquid again after it has set; but don't let it dry the wood underneath it, or it will burn the glue and scorch the veneer, and ruin the

work. Fifth, having got out all the glue possible, search the surface for blisters, which will at once be betrayed by the sound they give when tapped with the handle of the hammer; the hot iron, (or the inner vessel of the glue pot itself, which often answers the purpose) must be applied, and the process with the hammer repeated.

When the hammer is not in the hand, it should be in the hot water.

The whole may now be sponged over with hot water, and wiped as dry as can be. And observe throughout the above process, never have any slop and wet about the work that you can avoid. Whenever you use the sponge, squeeze it well first. Damp and heat are wanted, not wet and heat. It is a good thing to have the sponge in the left hand nearly all the time, ready to take up any moisture or squeezed out glue from the front of the hammer.

So much for laying veneers with the hammer, which though a valuable tool for the amateur, is not much used in the best cabinet maker's shops; cauls are adopted instead. They are made of wood the shape and size of the surface to be veneered, or, better still, of rolled zinc plate, and being made very hot before a good blaze of shavings, they are clamped down on the work when the veneer is got into its place; they must be previously soaped, to prevent them sticking to the veneer. The whole is then left to dry together. The hammer is quite sufficient for most amateurs. I have laid veneers with it 5ft. long by 18in. wide, without assistance, and without leaving a blister. Cauls, however, are very necessary if a double curve has to be veneered, or a concave surface; they need not be used for a simple convex surface. By wetting well one side of the veneer it will curl up, and can easily be laid on such a surface; but it will be well to bind the whole round with some soft string to assist it in keeping down while drying.

VENEERED WORK, To Polish.—No attempt at scraping, sandpapering, or polishing veneered work must be made till the glue is perfectly dry and hard. It should be left twenty-four hours at least, in a warm room, and is better still if left two or three times as long.

The processes for French polishing vary somewhat, according to the nature of the wood. For common work in deal, the wood may be well sized first, then papered with fine glass paper, and polished.

For mahogany, walnut, and similar porous woods, the pores must be filled by rubbing in, on a roller of old carpet, a mixture of Russian tallow (that is, tallow free from salt) and plaster of Paris, well amalgamated, before the fire in cold weather. Russian tallow may be had, at most oil shops, generally pure enough; but if the presence of salt be suspected, refine it by boiling it in plenty of water, stirring it well and skimming it. Set it by to cool, and use the cake of tallow which will be at the top.

The more this filling up process is persevered in, the less will be the subsequent labor in polishing; quite a bright surface should be got up by this alone. The mixture of tallow and plaster may be darkened with red lead for mahogany, or with other coloring matter according to fancy.

This filling is not for boxwood, ebony, or other of th

To polish a surfaw ing

hard wood, and not in the lathe, take a ball of cotton wool saturated with methylated French polish; cover it with a fold of linen cloth; on the linen cover put, with the tip of the finger, a drop or two of raw refined linseed oil (not "boiled oil"); get on a good body of varnish by rubbing always one way with circular strokes; be very careful to go over all the ground each time you work round the surface; and do not go over the same spot twice before you have gone over all. The longer this is done the better. Never mind the smears, which, though they look queer, are the very appearance you want at this stage. Having got on a good body, leave your work and take to another piece. It is good to leave it, if convenient, even for a day or two. By the way, shut all doors and windows before you begin. You can't do French polishing in a draft or in a very cold room.

When you resume work, use a mixture of half methylated French polish and half methylated spirit, or less than half of the spirit when you commence, and put now as little as possible on the wool, covering with more than one fold of fine linen or cambric. Very little oil as before—only just enough to prevent the rubber from sticking to the work; go over it lightly, with an easy gentle touch, in circular strokes, all one way. Never mind the smears. When it comes to look something like a good result, which it soon will, you may take out the smears by rubbing up and down with a mere trace of spirit on wool well covered with the linen, but avoid going over the same place twice, and be very light and gentle, or you will remove your polish. Finally rub it well with a clean wash leather (carefully folded, so as to leave no hard crease which will scratch), or an old silk handkerchief, breathing on the work occasionally.

Boxwood, ebony, cocus, etc., may be rapidly polished in the lathe. At first get a body of polish on, and this can be done without using any oil. The work must not be turned around rapidly, but the pulley of the lathe moved slowly by hand; then use your rubber with a drop of oil, and finally, the polish thinned with spirit.

If either on flat or turned work you require a very superior polish, you may remove nearly all the first coat with fine glass paper, and put it on again which will not take long, the pores being all filled. Remember that throughout the oil is only used to prevent the rubber from sticking, and it has to be got out afterwards with the spirit; so never use more than necessary.

In the lathe, when you come to the wash leathers, the work may be driven rapidly. A bit of ebony can be polished in 5 or 6 minutes to such a surface that small print can be easily read in it as in a mirror. Don't use your rubbers when they get hard and dry, but, nevertheless, stick to an old one as long as you can, and, if you have to put them by, keep them in a tin box tightly covered.

VENTILATION, Simple Means of.—A piece of wood an inch or more in thickness, three inches wide, and exactly as long as the breadth of the window through which ventilation is to be established, is to be prepared. Let the sash be now raised, and let the slip of wood be placed upon the side of the window; the sash is then to be drawn down closely upon the slip of wood. If the slip has been well fitted—and the fitting may be made more complete by adapting

it to the grooves in the sash and its frame, if any exist—no draught will be experienced in consequence of the displacement of the sash at this part. The effect of such an arrangement is, however, to cause a separation between the bars of the sashes at the center. By this means a perpendicular current of air will be projected into the room between the glass in the upper and lower sashes and their respective bars, or else the current will pass outwards in the reverse direction, in a manner by which all inconvenience from draught will be avoided.

Supposing that two or more windows at opposite sides of a room are fitted in this manner, a very satisfactory ventilation will be secured. Owing to a difference in its equilibrium, the air will rush in on one side, and rush out on the other side of the apartment. If the slips of wood are painted of the same color as the windows themselves, they will attract little notice.

VENTRILLOQUISM.—A common mistake is to suppose ventriloquism to be "throwing the voice" into some place. This is of course impossible. Others, misled by the derivation of the word, which comes from two Latin ones, *venter*, the belly, and *loquor*, to speak, think it means speaking from the stomach or with the muscles in that region. Now the whole art of ventriloquism consists in making sounds that shall imitate those naturally and usually proceeding from a designated place. The ventriloquist speaks without moving his lips for the purpose of deceiving the spectator, as the eye has always much to do in leading the imagination. To speak without moving the lips makes it necessary to do it with the muscles of the throat, and hence the whole mystery is thus to cultivate the ear so as to know exactly what sound would proceed from a certain locality, and then to train the throat so that you can make them without moving the lips. There are many persons ventriloquists without knowing it, and there are many who find great difficulty in acquiring it because they imagine it an intricate or mysterious art. To become skillful of course requires practice, and there are many sounds which cannot be imitated by voice merely, such as the singing of birds, the strident noise of a saw, the whistling of a plane, etc. Such and similar unmusical sounds are imitated by means of the teeth, the lips or the soft parts of the mouth. Thus the noise of a saw is like that produced by hawking, only much prolonged, and modified by the cheeks; singing of birds may be imitated by whistling through the teeth. The foaming of soda water by breathing with open lips into a tumbler, etc.

WAGONS, To Grease.—Few people fully appreciate the importance of thoroughly lubricating the axles, etc., of wagons and carriages, and still fewer know what are the best materials and the best methods of applying them. A well made wheel will endure common wear from ten to twenty-five years, if care is taken to use the right kind and proper amount of grease; but if this matter is not attended to, they will be used up in five or six years. Lard should never be used on a wagon, for it will penetrate the hub, and work its way out around the tenons of the spokes, and spoil the wheel. Tallow is the best lubricator for wooden axle-trees, and castor-oil for iron. Just grease enough should be applied to the spindle of a wagon to give it a light coat-

ing; this is better than more, for the surplus put on will work out at the ends, and be forced by the shoulder-bands and nut-washers into the hub around the outside of the boxes. To oil an axle-tree, first wipe the spindle clean with a cloth wet with spirits of turpentine, and then apply a few drops of castor oil near the shoulders and end. One teaspoonful is sufficient for the whole.

WAGON HUBS, To Prevent the Cracking of in Seasoning.—Take a common "try pot," such as is used by whalers, or a farmer's large boiling kettle; fit to it a wooden cover, to fasten with small screw bolts or clamps to the rim to be vapor tight. A piece of one inch gas pipe screwed into the cover serves to convey the vapor of the coal tar from this extemporized still to a large cask, which may be set upon one head, as a receptacle for the hubs. The still pipe is led to the bottom of the cask, which is then filled with hubs, and a cover fitted over all, to be vapor tight, with a small safety valve arrangement to regulate the pressure. The kettle is then filled with refuse matter from the gas works or crude coal tar, the cover secured, a fire lighted under the kettle, and shortly the lighter vapors penetrate the mass of hubs at a temperature of about two hundred to two hundred and twenty degrees Fah. The hubs are effectually and gradually heated, so that all the watery particles are expelled from the wood in steam and replaced by the light vapors of the hydrocarbon oil. Subsequently the heavier oils are distilled over and fill the pores of the wood. The process is finished in about twelve hours, and you have a hub that will stand anywhere short of a fire. A few experiments will satisfy any one of the efficacy of this treatment. One of the products of this distillation is carbolic acid—the best known antiseptic—and the hubs will be found strongly impregnated with the peculiar smell of this well known agent.

WAGON TIRES, To Keep on the Wheel.—A practical mechanic suggests a method of so putting tires on wagons that they will not get loose and require resetting. He says he ironed a wagon some years ago for his own use; and, before putting on the tires, he filled the felloes with linseed oil, and the tires have worn out and were never loose. His method is as follows: He used a long cast iron heater made for the purpose; the oil is brought to a boiling heat, the wheel is placed on a stick, so as to hang in the oil, each felloe an hour. The timber should be dry, as green timber will not take oil. Care should be taken that the oil is not made hotter than a boiling heat, or the timber will be burned. Timber filled with oil is not susceptible of injury by water, and is rendered much more durable by this process.

WALKS (Gravel), To Make.—The bottom should be laid with lime-rubbish, large flint stones, or any other hard matter, for eight or ten inches, to keep weeds from growing through, and over this the gravel is to be laid six or eight inches thick. This should be lain rounding up in the middle, by which means the larger stones will run off to the sides, and may be raked away; for the gravel should never be screened before it is laid on. It is a common mistake to lay these walks too round, which not only makes them uneasy to walk upon, but takes off from their apparent breadth. One inch in five feet is a

sufficient proportion for the rise in the middle; so that a walk twenty feet wide should be four inches higher at the middle, than at the edges, and so in proportion. As soon as the gravel is laid, it should be raked, and the large stones thrown back again; then the whole should be rolled both lengthwise and crosswise; and the person who draws the roller should wear shoes with flat heels that he may make no holes, because holes made in a new walk are not easily remedied. The walks should always be rolled three or four times after very hard showers, from which they will bind more firmly than otherwise they could ever be made to.

WALKS, To Keep Weeds under on.—Weeds on walks may be kept under by watering the gravel with the following solution: Dissolve two pounds of blue vitriol in an old pan, and then dilute it with six or seven gallons of water; apply this through the fine nose of a watering pot, and it will destroy every sign of vegetation.

WASHING (Chemical) Preparation.—Take a $\frac{1}{4}$ of a pound of soap, a $\frac{1}{4}$ of a pound of soda, and a $\frac{1}{4}$ of a pound of quicklime. Cut up the soap, and dissolve it in 1 quart of boiling water; pour 1 quart of boiling water over the soda, and 3 quarts of boiling water upon the quicklime. The lime must be quick and fresh; if it is good, it will bubble up on pouring the hot water upon it. Each must be prepared in separate vessels. The lime must settle so as to leave the water on the top perfectly clear; then strain it carefully (not disturbing the settlings) into the washboiler with the soda and soap; let it scald long enough to dissolve the soap; then add 6 gallons of soap water. The clothes must be put in soak over night, after rubbing soap upon the dirtiest parts of them. After having the above in readiness, wring out the clothes which have been put in soak, put them on to boil, and let each lot boil half an hour; the same water will answer for the whole washing. After boiling each lot half an hour, drain them from the boiling water, put them in a tub, and pour upon them two or three pailfuls of clear, hot water; after this they will want but very little rubbing; then rinse through two waters, bluing the last. When dried, they will be a beautiful white. After washing the cleanest part of the white clothes, take 2 pails of the suds in which they have been washed, put it over the fire and scald, and this will wash all the flannels and colored clothes, without any extra soap. The white flannels, after being well washed in the suds, will require to be scalded by turning on a teakettle of boiling water.

WATER, To Find.—In the early part of the year, if the grass assumes a brighter color in one particular part of a field than in the remainder, or, when the latter is ploughed, if a part be darker than the rest, it may be suspected that water will be found beneath it.

In summer, the gnats hover in a column, and remain always at a certain height above the ground, over the spots where springs are concealed.

In all seasons of the year, more dense vapors arise from those portions of the surface from which, owing to the existence of subterranean springs, a greater degree of humidity gives rise to more copious exhalations, especially in the morning or the evening. It is for this reason that the well-sinkers of northern Italy go in the morning to the places near which it is desired

to sink a well; they lie down upon the ground and look toward the sun to endeavor to discover the places in the neighborhood from which denser vapors may arise than from the rest of the field.

The springs to which these rules apply are such only as are near the surface; when the source is lower they are rarely sufficient, and the only safe guide is a boring; but to execute such operations with any chance of success, a certain knowledge of elementary geology is absolutely necessary. Provided the sources do not descend to any very great depth, the principle that subterranean waters follow precisely similar laws to those upon the surface holds good; but when they are deep-seated, many disturbing causes, to be noticed hereafter, modify their action. If, in a valley formed in a diluvial or alluvial deposit lying upon a more retentive stratum, the two sides are of the same height, the water must be sought in the middle; and if on the contrary, one side be steeper than the other, the stream would pass nearer the steeper side; in both cases supposing that the materials of the upper stratum are equally permeable throughout, and that the depression of the lower stratum presents a tolerably regular basin-like depression. Springs are often not to be met with at the head of valleys, but they are much more frequently to be found at the intersection of the secondary valleys with the principal one; and the most favorable point for finding water is usually that which is furthest from the intersection of these valleys, and in the lower parts of the plain succeeding them, at precisely those positions where there is the least water upon the surface.

When the transverse valleys, giving forth streams to a river in the bottom of a longitudinal valley, are nearly at right angles to the direction of the latter, the quantity of water they yield is less than when they form an angle with it. This law holds equally good with subterranean and with surface waters, and it may therefore be laid down as a maxim that the most favorable point for seeking a supply by a well would be at the mouth of long transverse valleys inclined to the principal one.

If the structure of the earth consists of stone with many veins, such as red shale, water is found almost anywhere except on the tops or near the tops of hills. Boring, of course, is a perfect test, and where there is great doubt and wells must be dug very deep (judging by others in the neighborhood), this ought to be resorted to. Much can be guessed at in this way. In a neighborhood lying between a tolerably regular series of elevations, the subterranean water will probably be at a regular level. If there are any wells already in existence with a steady supply of water, you have only to ascertain how much higher or lower the surface at the selected spot is than at the well already made. If you are ten feet higher, your well must be ten feet deeper than the one made, and vice versa. This difference in level can be ascertained with a leveling instrument, or with a shrewd man by guess.

WATER, To Determine whether it be Hard or Soft.—To ascertain whether or not water be fit for domestic purposes, to a glassful of the water add a few drops of the solution of soap in alcohol. If the water be pure, it will continue limpid; if hard, white flakes will be formed.

WATER (Hard), To Improve.—If nothing

but lime is the trouble, this can be easily diminished to one fifth or one sixth by means of quicklime. Notwithstanding it appears paradoxical how an addition of lime can improve water having already an excess of lime, it is nevertheless a fact. The lime dissolved in water is always the carbonate of lime, which is the chemical name for the different kinds of so-called limestone, marble, chalk, Iceland spar, etc.; this carbonate of lime is almost insoluble in pure water. When, however, the water contains carbonic acid it dissolves large quantities of the same, as may be seen at druggists who from fountains draw carbonic acid water (so-called soda-water) over marble counters, these counters becoming eventually almost honey-combed at their surface by its action. All that is necessary in your case is to dispose of this free carbonic acid, which is the cause of the solvent power of the water for limestone. If, now, quicklime is mixed with a small quantity of water, and left to settle until clear, a solution of lime in water will be obtained. As quicklime is soluble in the same, you must cover up your vessel, as otherwise this lime-water will attract carbonic acid from the air and become turbid. This clarified lime-water poured in your hard spring-water, will at once cause its free carbonic acid to combine with the lime, and form chalk, which will precipitate with it the chalk or limestone naturally in solution in the water, as the cause of the solubility, the free carbonic acid, is removed. The quantity of lime-water to be used depends, of course, on the amount of limestone in solution in your spring-water, and has to be determined by experiment, in order to avoid an excess of lime-water. Take, for instance, a gallon of spring-water, pour in a few ounces of clear lime-water, it will become milky; let it settle, then pour in more lime-water; if it again becomes milky, it wants still more; therefore repeat the addition of lime-water till you find what quantity produces milkiness, while a further addition has no effect; this is then the quantity needed. Say, for instance, that you find it to be eight ounces, then you know that your water requires eight ounces of lime-water to the gallon to remove most of the dissolved limestone in the same, which will separate by settling while you draw off the clear water over it; the sediment is very fine chalk; and if obtained in sufficient quantity, may be used for whitening. It is evident that you will have to construct a cistern or reservoir to conduct this operation in. If you are able to obtain very pure quicklime, you may, to simplify operations, make a milk of lime, using, for instance, for every ton of hard spring-water to be treated, one pound of quicklime mixed with half a gallon of water. Pour it in the cistern, stir it up for a few minutes and let it settle. The use of quicklime to purify lime-water has quite recently been successfully introduced in the chalk districts of England by Professor Tyndall, who has found that by careful treatment as much as eighty-two per cent. of the lime has been removed from hard waters.

WATER, To Prevent Becoming Rusty.—This is founded on the principle that iron becomes rusty only in water that contains air. It is the oxygen of the air, contained in the water, that unites with the iron and produces rust.

So, also, the rusting of iron in water removes the oxygen of the air from the water. But water in which there is no oxygen or atmospheric air

can not become putrid. To prevent water from becoming putrid, we have, therefore, only to put in it some bits of iron. Some pieces of sheet-iron (not rusty) or iron turnings are the best. Cast-iron is not so good.

The practical applications of this are numerous. Drinking-water on ships may be kept sweet by putting it in sheet-iron tanks, or by putting bits of iron into the water-casks. Water in which leeches are kept will remain sweet without changing it, by putting a few scraps of iron in the vessel. The offensive smell from the water in the vases of flowers will be prevented by a few small nails, or bits of sheet-iron in the bottom of the vases. The putrefaction of water, so common in the bottom of rain-water cisterns, would be prevented by scraps of iron or iron-turnings. In this case, it would be well to put the iron where it would not be disturbed. Perhaps if inclosed in a loose bag or net, it would be well.

WATER, To Purify when Putrid.—1. Water, 1 lb.; sulphuric acid, 8 drops. Mix, and filter through charcoal.—2. Water, 8 gallons; powdered alum, 1 ounce. Dissolve with agitation, then allow it to rest for 24 hours, decant into another vessel, and add a solution of carbonate of soda, until it ceases to produce a precipitate.—3. Instead of alum add seven or eight grains of red sulphate of iron, then proceed as before.—4. Add a little aqueous chlorine to the foul water.—5. Arrange a suitable pipe to the end of a pair of bellows, (double bellows are best,) and continue driving the atmospheric air through the water for some time, then allow it to settle for use.

WATER, To Clear when Muddy.—It is a peculiar property of alum that, when in solution, it will combine with the most foreign particles in suspension, or even in solution. In fact, on this property is founded the manufacture of the lakes used in painting, the dissolved coloring matter being precipitated by alum. In the same manner, all dirty coloring matter in a pailful of water may be precipitated by dissolving in it a piece of alum as small as a hickory nut, or even smaller, according to the degree of impurity of the water. Simply dissolve the alum, stir up, and let it settle. Along the Missouri and Mississippi rivers this method is frequently employed. When no excess of alum is used, this also is mostly carried down in the deposits.

WATER, To Keep Cool without Ice.—Water can be kept cool for drinking in warm weather by the following method: Get fresh water, let it be kept in an unglazed earthen ware pitcher, wrapt around with two or three folds of coarse cotton cloth kept constantly wet. The theory of cooling water in this manner is the absorption of heat from it by the evaporation of the moisture in the cotton cloth—expansion produces cold, compression heat.

WATER FILTER.—Vœlcker calls attention to the use of spongy iron as a deodorizing material of greater potency than animal charcoal. Sewage water passed through a filter of spongy iron is completely purified, and this water, after having been kept six-months protected from the air, was perfectly sweet and free from fungus growth. The spongy iron was obtained by calcining a finely divided iron ore and charcoal.

WATER TANKS.—Wooden tanks and barrels are totally unfit to keep water in; the

wood continually gives organic extractive matter to the water, which in warm weather originates microscopic fungoid growth, which in its turn hastens the decay of the wood. All who have ever made a long sea-voyage on board of a vessel where water was kept in wooden barrels, will never forget the nauseous taste, lasting until the settling of the particles, or the exhaustion of the organic action producing the fungoid growth. In regard to zinc in comparison with lead, it is also poisonous; but lead is by far the worst. Workmen in zinc-white factories and painters using zinc white are apt to get the zinc colic, which is similar to the lead colic, but more mild in its forms, and yields more easily to the same remedies. Galvanized iron being iron covered with a zinc coating, is in this respect identical with zinc, and we should prefer either to lead, which, for some kinds of water—rain water, for instance—is decidedly dangerous, as it dissolves the lead easier than the zinc. The best method, however, is to employ plain iron tanks, as used on ship-board. Oxidation of the iron goes on, it is true; but this is exceedingly slow—slower than is the case with any steam-boiler; and if any of the iron oxide dissolves in the water, it will in any case be very little, and even if considerable, it would give the water tonic properties, as iron is healthy. It gives the red color to our blood, and is, in fact, needed in the system; therefore, we are taking it all the time in minute doses with our food. All fertile soils contain iron. Its healthy properties have caused the justly-earned reputation of chalybeate springs; and in preserving our water in iron tanks the loss of iron by oxidation is fully compensated by the improved healthfulness of the water. Therefore we say, away with zinc or galvanized tanks and tubes, and above all, away with lead-lined tanks and tubes, and substitute tanks of boiler-iron and iron tubes; let them rust; and if they give out in 30 years or thereabout, your children may substitute new ones, and in the mean time you will prolong your own life many years, or at least spare yourself sickness and suffering.

WATER PIPES, To Manage in Winter.—When the frost begins to set in, cover the water pipes with hay or straw bands, twisted tight round them. Let the cisterns and water-butts be washed out occasionally; this will keep the water pure and fresh.

In pumping up water into the cistern for the water-closet, be very particular, in winter time. Let all the water be let out of the pipe when done; but if this is forgotten, and it should be frozen, take a small gimblet and bore a hole in the pipe, a little distance from the place where it is let off, which will prevent its bursting. Put a peg into the hole when the water is let off.

WATER PIPES, To Mend.—A British scientific publication gives the following letter: "Many of your readers have doubtless had more or less trouble, at some period of their lives, in repairing water pipes where the water could not be shut off conveniently at the fountain head or some intermediate point. In going to my office, a few days since, my way led past a place where a man was repairing a lead pipe, which had been cut off accidentally in making an excavation. There was a pressure of water of more than fifty feet head. His plan seemed to me to

be novel and ingenious. The two ends of the pipe were plugged, and then a small pile of broken ice and salt was placed around them; in five minutes the water in the pipe was frozen, the plugs removed, a short piece of pipe inserted and perfectly soldered, and in five minutes the ice in the pipes was thawed and the water flowing freely through."

WATER PIPES, To Unite.—An excellent material for uniting water pipes is prepared by combining four parts of good Portland cement and one part of unslaked lime mixed together in small portions in a stout mortar, adding enough water to permit it to be reduced to a soft paste.

WATERING STREETS, Chemical Solution for.—For several years experiments with chemical solutions for watering streets have been employed in various English cities with considerable success. A mixed solution of common salt and chloride of lime has been used to a large extent. These salts attract moisture sufficient to keep the street dust from becoming absolutely dry unless neglected. A very small quantity is said to answer the purpose, and not only to keep the dust well laid, but also to act as an antiseptic, cleaning the streets of foul odors.

WATER-TIGHT CELLAR FLOORS.—When floors are not subjected to a great pressure of water, a good hydraulic cement or water lime will form a tight cellar bottom and sides; but when the whole soil is full, and the cellar is like a basin in it, the pressure of the water upward will surely find crevices where it will ooze up. The cure for this state of things is to get drainage, if possible, and if this cannot be had and repeated patching will not stop the leaks, in a very dry time take up the top of the floor, and after covering the whole with a layer of gravel, pour into it melted asphaltum, which should be rolled and pounded down while warm, and one or two more layers applied, topping with sand. If the gravel can be hot also, it will make a much better floor; but if it can not be, some coal tar may be mingled with the asphaltum, and the gravel coated slightly with it before the hot asphaltum is applied.

WATER-PROOF PAPER.—The solution of oxide of copper in ammonia acts, as is well known, as an energetic solvent upon cellulose. This property is made use of to water-proof paper in the following manner: A tank is made to contain the solution just alluded to, and the paper is rapidly passed just over and in contact with the surface of the liquid, by means of properly placed rollers moving with speed. The paper, on leaving, is pressed between two cylinders, and next dried by means of so-called drying cylinders similar to those in use in our paper mills. The short contact of the felty paper tissue with the liquid gives rise to just sufficient solution of cellulose to form an impermeable varnish.

WATER-PROOF PACKING-PAPER.—Water-proof packing-paper is thus made by some manufacturers: The paper is covered with a resinous liquid, then painted over with a solution of glue and soot, as without this the paper will later show blotches. After this is dried, the actual water-proof coat is applied. This is prepared with two and a half ounces of powdered shellac, dissolved in two pints of water, which

is gradually brought to boil, and stirred until the substance is perfectly dissolved and softened, when gradually one third ounce of powdered borax is added, until an intimate union of the substances takes place. The liquid is then left to cool, and while still hot any mineral color may be added, such as lampblack, yellow ochre, red ochre, iron blue, or burnt umber, whereupon it is left to get entirely cold. It is then ready for use. The operation can be so quickly performed with a brush that two women can prepare three thousand feet in ten hours.

WATER-PROOF for Porous Cloth.—Dissolve $2\frac{1}{2}$ lbs. alum in 4 gal. water; dissolve also, in a separate vessel, the same weight of acetate of lead in the same quantity of water. When both are well dissolved, mix the solutions together; and, when the sulphate of lead resulting from this mixture has been precipitated to the bottom of the vessel in the form of a powder, pour off the solution, and plunge into it the fabric to be rendered water-proof. Wash and rub it well during a few minutes, and hang it in the air to dry.

WATER-PROOF for Tweeds.—Take two pounds four ounces of alum and dissolve it in ten gallons of water. In like manner dissolve the same quantity of sugar of lead in a similar quantity of water, and mix the two together. They form a precipitate of the sulphate of lead. The clear liquor is now withdrawn, and the cloth immersed for one hour in the solution, when it is taken out, dried in the shade, washed in clean water, and dried again. This preparation enables the cloth to repel water like the feathers of a duck's back, and yet allows the perspiration to pass freely through it.

WATER-PROOF Composition for Wood.—Dr. Scherzer, an Austrian official at Pekin, has just sent to his government some specimens of a Chinese composition called "Schieioiao," which has the property of making wood and other substances perfectly water-tight. He says that he has seen in Pekin wooden chests which had been to St. Petersburg, and had come back uninjured, and that the Chinese use the composition also for covering straw baskets, which are afterwards employed in carrying oil for long distances. Cardboard, when covered with the composition, becomes as hard as wood; and most wooden buildings in Pekin have a coating of it. It consists of three parts of blood deprived of its fibrine, four of lime, and a little alum.

WEATHER SIGNS.—Animated bodies receive peculiar impressions that precede and announce change of weather. Thus we hear distant sounds better when there is going to be rain; we also then see remote objects more distinctly, and bad odors are more offensive than usual.

Swallows skim the ground in their flight; is it that they may feed on the worms that then come out on the surface? Lizards hide, cats make their toilet, birds oil their feathers, flies bite more sharply, chickens scratch themselves and roll in the dust, fish leap out of the water, and aquatic birds flap their wings and dabble in the ponds and brooks.

Nearly all the signs indicated announce dampness in the air, rather than the approach of rain, for they are not seen when a storm occurs in dry weather. Thus the swelling of wood-work,

which renders it difficult to close doors made of soft timber, and the contraction and tension of cordage made of vegetable fibres, are counted among the signs of atmospheric humidity. Rude hygrometers have even been constructed of these fibres.

Certain flowers do not open at all in rainy weather; others, the Siberian thistle particularly, remain open or shut according as the weather is going to be rainy or dry.

Pallor of the sun announces rain; it is seen, at such times only, through an atmosphere laden with vapors. If the heat be stifling, that too is a sign of rain; for one is then surrounded by an atmosphere saturated with vapor, and more readily heated, owing to its lack of transparency. If the vapors be collected in clouds, the sun's rays that pass through the latter heighten the temperature more than they would have done in perfectly clear weather. If the sun be clear and brilliant, it foretells a fine day; but when the sun is at its rising preceded by redness, and this redness passes off the moment it does appear, the sign is of rain.

Two winds of opposite qualities succeeding each other often bring rain. Thus a cold wind, entering an atmosphere impregnated with moisture by the warm wind that preceded it, will bring about a precipitation of water; and the same will be the case where a damp, warm wind enters air that had been chilled by the wind that had preceded it.

Generally, an approaching rain can be better foreseen when the sky presents several banks or layers of clouds resting one above the other. The winds that carry with them detached masses of clouds yield but light rains.

Motionless clouds, lying in the quarter whence the wind blows, bring only a continuance of that wind; but if they appear in the opposite quarter, they announce its termination.

Clouds coming up simultaneously, yet impelled by different winds, announce an early storm.

Clouds accumulating on the sides of mountains foretell rain.

The following are the signs most familiar to navigators and farmers:

A rosy sky at sunset, fine weather. A red sky in the morning, bad weather, or a great deal of wind.

A gray sky in the morning, fine weather. If the first light of dawn appears over a bed of clouds, wind may be looked for. If on the horizon, fine weather.

Light clouds with imperfectly defined edges announce fine weather and moderate breezes. Thick clouds with well-marked edges, wind. A deep, dark blue sky of sombre tinge indicates wind. A clear and brilliant blue sky indicates fine weather. The lighter the clouds look, the less reason is there to anticipate wind. The more dense, the more rolled together, twisted, and tattered they are, the stronger the wind will be. A brilliant yellow sky at sunset announces wind; a pale yellow one, rain. According to the predominance of red, yellow, or grayish tints, we can foretell the condition of the weather with a very close approximation to accuracy.

Small clouds of an inky color portend rain. Light clouds moving rapidly in the direction opposite to dense masses, announce wind and rain.

High clouds passing before the sun, the moon,

or the stars, in a direction opposite to that pursued by the lower beds of clouds, or of the wind felt at the surface of the soil, indicate a change of wind.

After fine weather, the first signs of a change are ordinarily high white clouds in belts, or in light dappled tufts or locks, which grow larger and soon form dense and sombre masses. Generally, the more remote and higher up these clouds appear, the less abrupt the change of weather will be, but it will be considerable.

Soft, light, delicate tints, with clouds of decided shade, indicate or accompany fine weather. Extraordinary tints and dense clouds, with hard outlines, indicate rain, and probably a gale of wind.

Remark the clouds that form on hills and other elevated places, and cling there. If they continue there, augment, or descend, they indicate rain. If they, however, ascend and disperse, they portend good weather. When sea-birds fly out away from land in the morning, there will be fine weather.

WEATHER TABLE, Dr. Adam Clark's.

—The table and the accompanying remarks are the result of many years' actual observation, the whole being constructed on a due consideration of the attraction of the sun and moon, in the several positions respecting the earth, and will by a simple inspection show the observer what kind of weather will most probably follow the entrance of the moon into any of its quarters, and that so near the truth as to be seldom or never found to fail.

MOON.	TIME OF CHANGE.	IN SUMMER.
If the New Moon, the First Quarter, the Full Moon, or the Last Quarter, happens	Between midnight and 2 in the morning.	Fair.
	Between 2 and 4, morning.	Cold, with showers.
	" 4 and 6, "	Rain.
	" 6 and 8, "	Wind and rain.
	" 8 and 10, "	Changeable.
	" 10 and 12, "	Frequent showers.
	At 12 o'clock, at noon, and 2 P. M.	Very rainy.
	Between 2 and 4, afternoon.	Changeable.
	" 4 and 6, "	Fair.
	" 6 and 8, "	Fair, if wind N. W.
	" 8 and 10, "	Rainy, if wind S. W.
	" 10 and midnight.	" " "
	" 12 and 2 A.M.	Fair.

Observations.—1. The nearer the time of the moon's change, First Quarter, Full, and Last Quarter, are to midnight, the fairer will the weather be during the seven days following. 2. The space for this calculation occupies from 10 at night till 2 next morning. 3. The nearer to midday or noon the phases of the moon happen, the more foul or wet weather may be expected during the next seven days. 4. The space for this calculation occupies from 10 in the forenoon to 2 in the afternoon. These observations refer principally to the summer, though they affect spring and autumn nearly in the same ratio. 5. The moon's change, First Quarter, Full, and Last Quarter, happening during six of the afternoon hours, i. e. from 4 to 10, may be followed by fair weather; but this is mostly dependent on the wind, as noted in the table. 6. Though the weather, from a variety of irregular causes, is more uncertain in the latter part of autumn, the whole winter, and the beginning of spring, yet in the main, the

above observations will apply to those periods also. 7. To prognosticate correctly, especially in those cases where the wind is concerned, the observer should be within sight of a good vane, where the four cardinal points of the heavens are correctly placed. Within this precaution, he will scarcely ever be deceived in depending on the table.

WEATHER TABLE, Dr. Herschell's.—The following table was constructed by the celebrated Dr. Herschell, upon a philosophic consideration of the attraction of the sun and moon. It is confirmed by the experience of many years' observation, and will suggest to the observer what kind of weather will probably follow the moon's entrance into any of her quarters. Though calculated for England it will be found applicable to other localities.

If the moon changes at 12 o'clock noon, the weather immediately afterward will be very rainy, if in summer, and there will be snow and rain in winter.

If between 2 and 4 o'clock P. M.; changeable in summer—fair and mild in winter.

Between 4 and 6 o'clock P. M.; fair in both summer and winter.

Between 6 and 10 o'clock P. M.; in summer, fair, if the wind is northwest; rainy, if south or southwest. In winter, fair and frosty, if the wind is north or northwest; rainy, if south or southwest.

Between 10 and 12 o'clock P. M.; fair in summer and frosty in winter.

Between 12 at night and 2 o'clock A. M.; fair in summer and frosty in winter, unless the wind is from the south or southwest.

Between 2 and 4 o'clock A. M.; cold and showery in the summer and snow and storm in the winter.

Between 4 and 6 o'clock A. M.; rainy both in winter and summer.

Between 6 and 8 o'clock A. M.; wind and rain in the summer and stormy in the winter.

Between 8 and 10 o'clock A. M.; changeable in summer, rain with a westerly and snow with an easterly wind in winter.

Between 10 and 12 o'clock A. M.; showery in summer, and cold and windy in winter.

WELLS, To Remove Foul Air from.—It is well known that many accidents occur to persons going down into wells to clean them, owing to the noxious gas in such places. To remove the gas before descent is made into any well, a quantity of burned but unslaked lime should be thrown down. This, when it comes in contact with whatever water is below, sets free a great quantity of heat in the water and lime, which rushes upward, carrying all the deleterious gas with it; after which, the descent may be made with perfect safety. The lime also absorbs carbonic acid in the well. Always lower a light before descending; if it is extinguished, there is still danger of suffocation.

Another simple method is to let an umbrella down and rapidly hauled up a number of times in succession. The effect is to remove the gas in a few minutes from a well so foul as to instantly extinguish a candle previous to the use of the umbrella.

WINDOW BLINDS, New.—This consists in a number of glass rods arranged either vertically or horizontally, and secured together by appropriate frames, forming a series of cylin-

drical lenses which break up the light and throw it into every part of the room, thus producing a soft and diffused glow which is very beautiful and pleasant. The glass rods may be of any color, and by an arrangement of the colors very beautiful effects can be produced.

WINE OF WILD CHERRY BARK.—Alcoholic extract (from 24 ounces) of wild cherry bark, $5\frac{1}{2}$ ounces; sweet almonds, 3 ounces; water, 1 pint; sherry wine, 2 pints. Beat the almonds with the water to a paste, rub down the extract with half a pint of the wine, and mix the two liquids in a bottle of the capacity of three pints, stop it closely, and permit it to stand for three days, with occasional agitation; then add the remainder of the wine, allow it to stand a week and filter. By this mode of proceeding, opportunity is afforded for the development of the hydrocyanic acid before the menstruum is made so alcoholic as to retard the reaction which favors its formation. Thus made, wine of wild cherry bark is a transparent, wine-red liquid, having an astringent bitter-almond taste and odor, much less agreeable than the syrup, and of about the same strength. The dose of this preparation as a tonic and sedative is a teaspoonful.

WOOD, To Prevent Decay in.—A process has been discovered for the prevention of the decay of wood. As the result of a five years' experience, a paint is recommended, which at the same time possesses the advantages of being impervious to water. It is composed of fifty parts of tar, five hundred parts of fine white sand, four parts of linseed oil, one part of the red oxide of copper in its native state, and finally, one part of sulphuric acid. In order to manufacture the paint from this multiplicity of materials, the tar, sand, and oil, are first heated in an iron kettle; the oxide and acid are then added with a great deal of caution. The mass is very carefully mixed and applied while hot. When thoroughly dry, this paint is as hard as stone.

WOOD, Preservation of.—The use of creosote, or sulphate of copper or iron, for preserving wood, is open to objections which unfit their employment for floorings or ornamental wood work, the first named leaving a permanent, disagreeable smell, the latter discoloring the wood. Borax is now found to be admirably adapted for keeping such from decay. The preparation is simple, and consists in immersing the wood in a saturated solution of borax, which is then heated to two hundred and twelve degrees Fahrenheit. The wood is left for ten or twelve hours, the time depending upon the density and size of the planks. When taken out, the boards are stacked until dry, then re-immersed in a weaker solution of the salt for a brief time, dried again, and are then ready for use. Boards thus prepared are practically indestructible from rot, and are nearly incombustible. Another preservative is said to be a compound of one part silicate of potassa and three of pure water—the wood to remain in the solution twenty-four hours, then dried for several days, then soaked and dried a second time, and subsequently painted twice over with a mixture of one part water-cement and four of the first-mentioned mixture. Thus prepared, it will not decay in the ground, and will be incombustible out of it.

WOOD, To Petrify.—Gem salt, rock alum,

white vinegar, chalk and pebbles powder, of each an equal quantity. Mix well together. If, after the ebullition is over, you throw into this any wood or porous substance, it will petrify it.

WOOD, To Season.—Small pieces of non-resinous wood can be seasoned perfectly by boiling four or five hours—the process taking the sap out of the wood, which shrinks nearly one-tenth in the operation. The same writer states that trees felled in full leaf in June or July, and allowed to lie until every leaf has fallen, will then be nearly dry, as the leaves will not drop of themselves until they have drawn up and exhausted all the sap of the tree. The time required is from a month to six weeks, according to the dryness or wetness of the weather. The floor of a mill laid with poplar so treated, and cut up and put in place in less than a month after the leaves fell, has never shown any shrinkage.

WOOD, To Split.—In splitting the saw pieces it is much easier to split by slabs than to try and cleave them through the centre. This means to split off pieces at a time, but a little from the edge; and we may add, that wood splits much more readily in the direction up from the root of the tree, than when the blow of the axe is downward. In other words, to split a chunk place it upside down—contrary to the direction in which it grew—before striking at it.

WOOD PULP, To Bleach.—A process of bleaching wood pulp has been made known by M. Orioli. He has recognized that chloride of lime, however little in excess, has a tendency to produce a yellow tint; that all the strong acids turn the paste red under the action of the sun, or in some time without sunlight, in the presence of moisture; that the slightest trace of iron is sufficient to blacken the paste in a very short time. These objectionable results are obviated by the following mixture: For 100 kilogrammes (200 lbs.) of wood pulp 800 grammes of oxalic acid are employed, this serving the double purpose of bleaching the coloring matter already oxidized and of neutralizing the alkaline principles favorable to oxidation; 2 kilogrammes (2½ lbs.) of sulphate of alumina, perfectly free from iron, are added. The principal agent in this new process is the oxalic acid, the energetic action of which on vegetable matters is well known. The sulphate of alumina added does not bleach of itself, but it forms with the coloring matter of the wood a nearly colorless lake, which heightens the brilliancy of the product.

WRITING, To Prevent Alterations in.—If you should desire at any time to write a document in such a manner as to render attempts at altering or falsifying your manuscript impossible, bear in mind a hint given in a French paper-makers' journal, that by steeping paper in a very weak solution of gallic acid, you obtain a writing surface upon which ordinary ink makes a mark that defies deceitful erasure or alteration, by rendering any attempt at such easily detectable.

WRITINGS, To Restore when Decayed.—Cover the letters with solution of ferrocyanide of potassium, with the addition of a diluted mineral acid; upon the application of which, the letters change very speedily to a deep blue color, of great beauty and intensity. To prevent the spreading of the color, which, by blotting the parchment, detracts greatly from the legibility, the ferrocyanide should be put on first, and the diluted acid added upon it. The method found

to answer best has been to spread the ferrocyanide thin with a feather or a bit of stick cut to a blunt point. Though the ferrocyanide should occasion no sensible change of color, yet the moment the acid comes upon it, every trace of a letter turns at once to a fine blue, which soon acquires its full intensity, and is beyond comparison stronger than the color of the original trace. If, then, the corner of a bit of blotting-paper be carefully and dexterously applied near the letters, so as to imbibe the superfluous liquor, the staining of the parchment may be in a great measure avoided; for it is this superfluous liquor which, absorbing part of the coloring matters from the letters, becomes a dye to whatever it touches. Care must be taken not to bring the blotting-paper in contact with the letters, because the coloring matter is soft whilst wet, and may easily be rubbed off. The acid chiefly employed is the muriatic; but both the sulphuric and nitric succeed very well. They should be so far diluted as not to be liable to corrode the parchment, after which the degree of strength does not seem to be a matter of much nicety.

WRITING, To Make Indelible.—The following simple process will make lead-pencil writing or drawing as indelible as if done with ink. Lay the writing in a shallow dish, and pour skimmed milk upon it. Any spots not wet at first may have the milk placed upon them lightly with a feather. When the paper is all wet over with the milk take it up and let the milk drain off, and whip off with the feather the drops which collect on the lower edge. Dry it carefully, and it will be found to be perfectly indelible. It cannot be removed even with India rubber. It is an old and a good recipe.

WRITE (How to) Business Letters.—Use the fewest words which will clearly convey your meaning; superfluous words waste time and are apt to confuse.

Write plainly. Elegant writing is often unreadable, and it is better to write legibly even if you think plain letters not so handsome. Be particular to make all proper names and figures especially plain. Flourishes are out of place in a business letter.

When ordering goods state carefully what you want and the amount you inclose.

In replying to a letter it is well to begin by stating in brief the substance of that letter's contents, so your correspondent will see that you have got his meaning, as well as to refresh his memory about the matter you are writing on.

Always sign your name and address in full to each letter you write, even though you have written to the same person before. Be careful to give post office, county and state very plainly, as different names are often very similar. It is well to spell the name of your state in full.

Always read your letter over before inclosing in the envelope, to make sure you have not forgotten anything. If money is to be inclosed, be sure it is. Seal securely and direct plainly.

It is well to make a little memorandum, at the time of writing, of what you have written, time, etc. This is handy to refer to in case of mistake.

If a dealer does not in due time respond to an order intrusted to him, in justice to yourself and him you should write for an explanation. State when you wrote to him, what you wrote for, amount, if any, inclosed, how you directed the goods to be sent, and any other information

you think important. If you do not remember the exact date, give the nearest guess you can to it. If you merely write,—"I sent you an order some time ago, and you haven't filled it," it is almost impossible to investigate the matter in an establishment of any size. It is unnecessary to call people swindlers, when you write to them, even if you think so. If they are honest, they will not be inclined to do more than they are bound to; if dishonest, they expect that kind of thing, and take it as a matter of course. When you know a person to be a cheat, don't waste your time and postage, telling him you will expose him, but go to work and do it.

WRITING, (New), To Make Look Old.—Take 1 dr. of saffron, and infuse it in $\frac{1}{2}$ pt. of ink, and warm it over a gentle fire, and it will cause whatever is written with it to turn yellow, and appear as if of many years' standing.

WRITING (Old), To Copy.—1. Press copies of old letters or manuscript can be taken, it is said, by pressing the pages on the dampened paper in the usual way, and then applying the vapor of ammonia. Although no result may appear to follow the first operation, we are assured that after the second the letters will appear distinctly on the dampened blotting-paper. Another method consists in dampening the manuscript with a solution of sugar, honey, or mucilaginous matter, and then applying as heretofore. In this case the sugar is put on the paper, instead of being mixed previously in the ink, as is done in one form or other with ordinary copying inks.—2. (*Carré's Method.*) This is accomplished by wetting unsized copying paper with a solution of one part of hydrochloric, or muriatic acid, and twelve of water, instead of plain water; and, after laying this on the manuscript, subjecting the whole to pressure with the ordinary copying press. This method has also lately been used to test the antiquity of certain writings, since, when the manuscript is thirty years old, only an illegible copy can be made. On the other hand, writing less than ten years old disappears entirely after immersion of some hours or days in the same solution, while that thirty years old and more continues legible after fifteen days' maceration. In taking a press copy of writing by Carré's method any acid absorbed by the paper can be neutralized by exposing it for a few seconds above a dish containing aqua ammonia.

WRITING, To Take out.—Wash by means of camel's hair pencils dipped alternately in solutions of cyanide of potassium and oxalic acid.

WRITING for the Press.—1. Do not say, "I write in a hurry, please correct all mistakes." You have ten times the opportunity to do this that the editor has. His time is worth from fifty cents to ten dollars an hour, and he will be likely to correct your errors by fire, and then they will never trouble any one any more. You must do your own work if you want it done. It is said that Newton wrote his chronology over fifteen times before he was satisfied with it, and Gibbon wrote out his memoir nine times before sending it to the press. No beginners can expect better success or less labor than such learned men.

2. Do not write poetry. Most who try, do not know what poetry is, and they cannot be told till they have learned a great deal more than they know now. Ninety-nine one hundredths of the rhyme written is good for three things: 1.

To give to friends who prize it for the giver's sake. 2. It makes passable kindlings. 3. It will bring about three cents a pound at the paper mill, to work up with old rags. Write prose;—poetic prose is far better than prosaic poetry.

3. Do not write long articles, or long sentences. Write as you would a telegram, where each word costs a dime, or an advertisement, which costs a dollar a line.

4. Do not ask an editor to return your manuscript. Keep a copy. With a hundred letters a day to read, he has something to do besides hunting up last year's manuscripts, received, rejected, and buried, or burned, long ago.

5. Do not get angry because your first article is rejected. Quite likely if it is printed, you will live to wish it had been burned, or sent to the paper mill. The first pair of shoes a cobbler makes are not likely to sell very readily; and it takes more skill and longer practice to write good articles than to make good shoes.

6. Keep trying and sending on; the practice will do you good; and if writing is in you it will come out. But if you cannot stand criticism, and rejection, and fault finding, you will make a poor author, and may as well know it at once. The writer's first article was rejected; he kept it awhile, sent it to the same paper again, and it was printed.

7. Remember an editor may have a peck of better articles than yours is, which he wrote himself, and yet does not think them worth publishing. He will do the best he can, consistently, by you. He is more anxious to encourage good writers than you are to write.

8. Do not expect a poor editor to set up a reading school, spelling school, grammar school and writing school for the benefit of those who have not improved their opportunities at home. You can study these matters anywhere; do not impose your ignorance on an editor, and then wonder that he has not time to fool over such nonsense. Some poor printer has to set up the type for your article. Every cent you save by using pale ink, poor paper, and writing carelessly because you are in a hurry, or writing finely, or crosswise, to save three cents postage, will cost the printer in toil, delay, and eye-sight, at least fifty times as much money as you will save, besides causing him to commit blunders for you to scold about. Do you wonder such articles are rejected?

9. Do not get angry. Do not write slang, or personalities, or abuse, or slander.

10. Finally. 1. Write with black ink, on white paper, wide ruled. 2. Make the pages small, one-fourth that of a foolscap sheet. 3. Leave the second page of each leaf blank. 4. Give to the written page an ample margin all round. 5. Number the pages in the order of their succession. 6. Write in a plain bold hand, with less respect to beauty. 7. Use no abbreviations which are not to appear in print. 8. Punctuate the manuscript as it should be printed. 9. For italics underscore one line; for small capitals, two; capitals, three. 10. Never interline without the caret to show its place. 11. Take special pains with every letter in proper names. 12. Review every word, to be sure that none is illegible. 13. Put directions to the printer, at the head of the first page. 14. Never write a private letter to the editor on the printer's copy, but always on a separate sheet.

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PERSONAL AND NEWSPAPER NOTICES.

[From the *Woman's Advocate*.]

The title of this work suggests the idea of another life on this earth-plane of existence—higher, holier, and purer in its aims, aspirations, and desires, and yet it does not suggest, or even intimate, to the prospective reader the true character and nature of the volume in its mission before the world. To the actual reader the title is truly significant and appropriate—as the writer so beautifully unfolds the Laws of Reproduction, by and through the observance of which the highest and purest type of humanity may be and is produced. The regeneration of the race, through the laws of physiological and psychological reproduction, is the leading and perhaps the grandest thought of Dr. Cowan's work.

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[*From Dr. Dio Lewis, of Boston, the well-known Author and Lecturer.*]

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[*Extract of a Letter from Robert Dale Owen to the Author.*]

I thank you much for the brave book you were so kind as to send me. The subjects upon which it touches are among the most important of any connected with Social Science, and the world is your debtor for the bold stand you have taken.

Yours sincerely, ROBERT DALE OWEN.

[*From Rev. Octavius B. Frothingham, of New York.*]

I have read with care "The Science of a New Life." If a million of the married and unmarried would do the same, they would learn many things of deepest import to their welfare.

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[*From W. Waite Warner, Editor of the Michigan State Register.*]

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[From the Christian Advocate, New York.]

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[From the Round Table, New York.]

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[*From the Banner of Light, Boston.*]

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[*From the Lowell Daily Courier.*]

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[*From the New York Albion.*]

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[*From the Register, South Jackson, Mich.*]

Books of this character can not be multiplied too rapidly, nor can the influence of such works as this, in releasing men and women from the strong bonds of ignorance, vice, and crime, be too highly estimated. The human race, we know, needs something stronger and more powerful than the influence of a single volume, however good, to remove the many evils of social and domestic life—line upon line, precept upon precept—a little here, and a great deal more there, can alone accomplish the great work of reformation, and restore the wasted, sin-polluted lives of our fellow-beings to a condition of moral purity; but we must admit that Dr. Cowan has done all that any lover of his race can do to check the downward course of the ignorant, thoughtless, and sinful.

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